FIG. 1

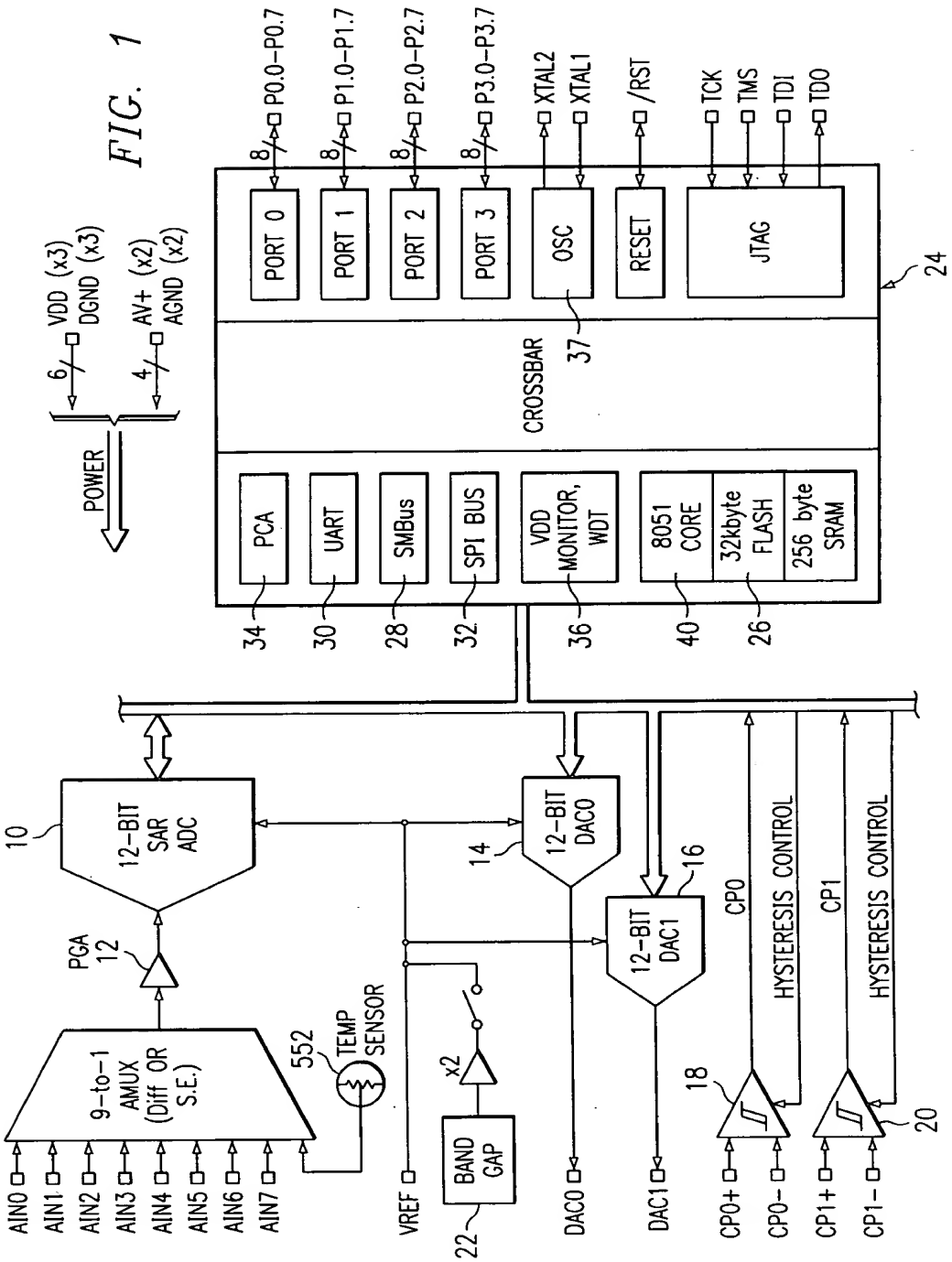
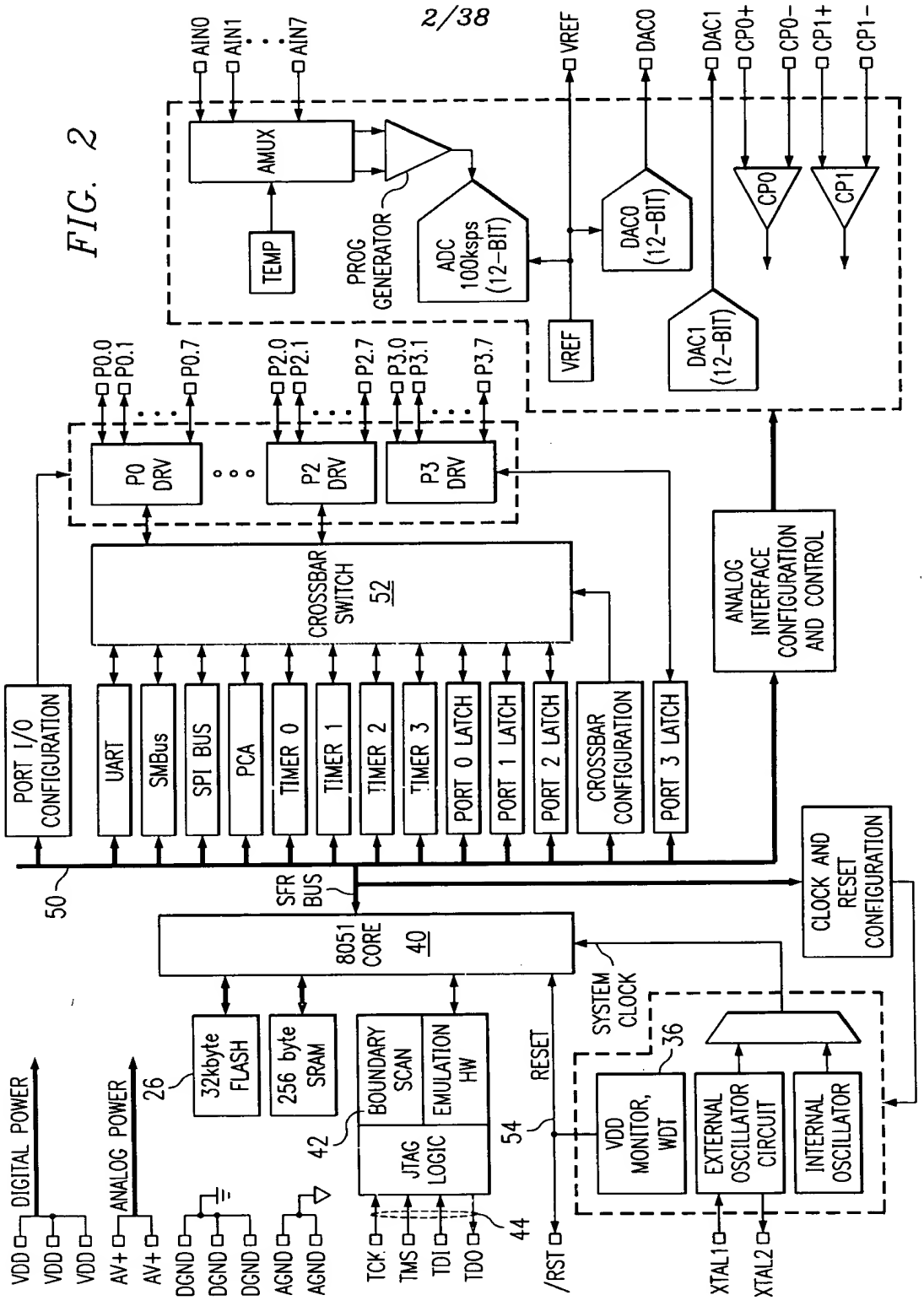

P0.0-P0.7
P1.0-P1.7
P2.0-P2.7
P3.0-P3.7
XTAL2
XTAL1
/RST
TCK
TMS
TDI
TDO
VDD (x3)
DGND (x3)
AV+ (x2)
AGND (x2)
POWER
PORT 0
PORT 1
PORT 2
PORT 3
OSC
RESET
JTAG
CROSSBAR
PCA
UART
SMBus
SPI BUS
VDD MONITOR, WDT
8051 CORE
32kbyte FLASH
256 byte SRAM
12-BIT SAR ADC
12-BIT DAC0
12-BIT DAC1
PGA
9-to-1 AMUX (Diff OR S.E.)
TEMP SENSOR
x2
BAND GAP
HYSTERESIS CONTROL
HYSTERESIS CONTROL
CP0
CP1
AIN0
AIN1
AIN2
AIN3
AIN4
AIN5
AIN6
AIN7
VREF
DAC0
DAC1
CP0+
CP0-
CP1+
CP1-
10
12
14
16
18
20
22
24
26
28
30
32
34
36
37
40
552

FIG. 2


AIN0
AIN1
AIN7
VREF
DAC0
DAC1
CP0+
CP0-
CP1+
CP1-
AMUX
TEMP
PROG GENERATOR
ADC 100ksps (12-BIT)
DAC0 (12-BIT)
DAC1 (12-BIT)
CP0
CP1
VREF
P0.0
P0.1
P0.7
P2.0
P2.1
P2.7
P3.0
P3.1
P3.7
P0 DRV
P2 DRV
P3 DRV
CROSSBAR SWITCH 52
ANALOG INTERFACE CONFIGURATION AND CONTROL
PORT I/O CONFIGURATION
UART
SMBus
SPI BUS
PCA
TIMER 0
TIMER 1
TIMER 2
TIMER 3
PORT 0 LATCH
PORT 1 LATCH
PORT 2 LATCH
CROSSBAR CONFIGURATION
PORT 3 LATCH
50
SFR BUS
8051 CORE 40
CLOCK AND RESET CONFIGURATION
SYSTEM CLOCK
36
26
32kbyte FLASH
256 byte SRAM
BOUNDARY SCAN
EMULATION HW
JTAG LOGIC
42
54
RESET
VDD MONITOR, WDT
EXTERNAL OSCILLATOR CIRCUIT
INTERNAL OSCILLATOR
DIGITAL POWER
ANALOG POWER
VDD
VDD
VDD
AV+
AV+
DGND
DGND
DGND
AGND
AGND
TCK
TMS
TDI
TDO
44
/RST
XTAL1
XTAL2

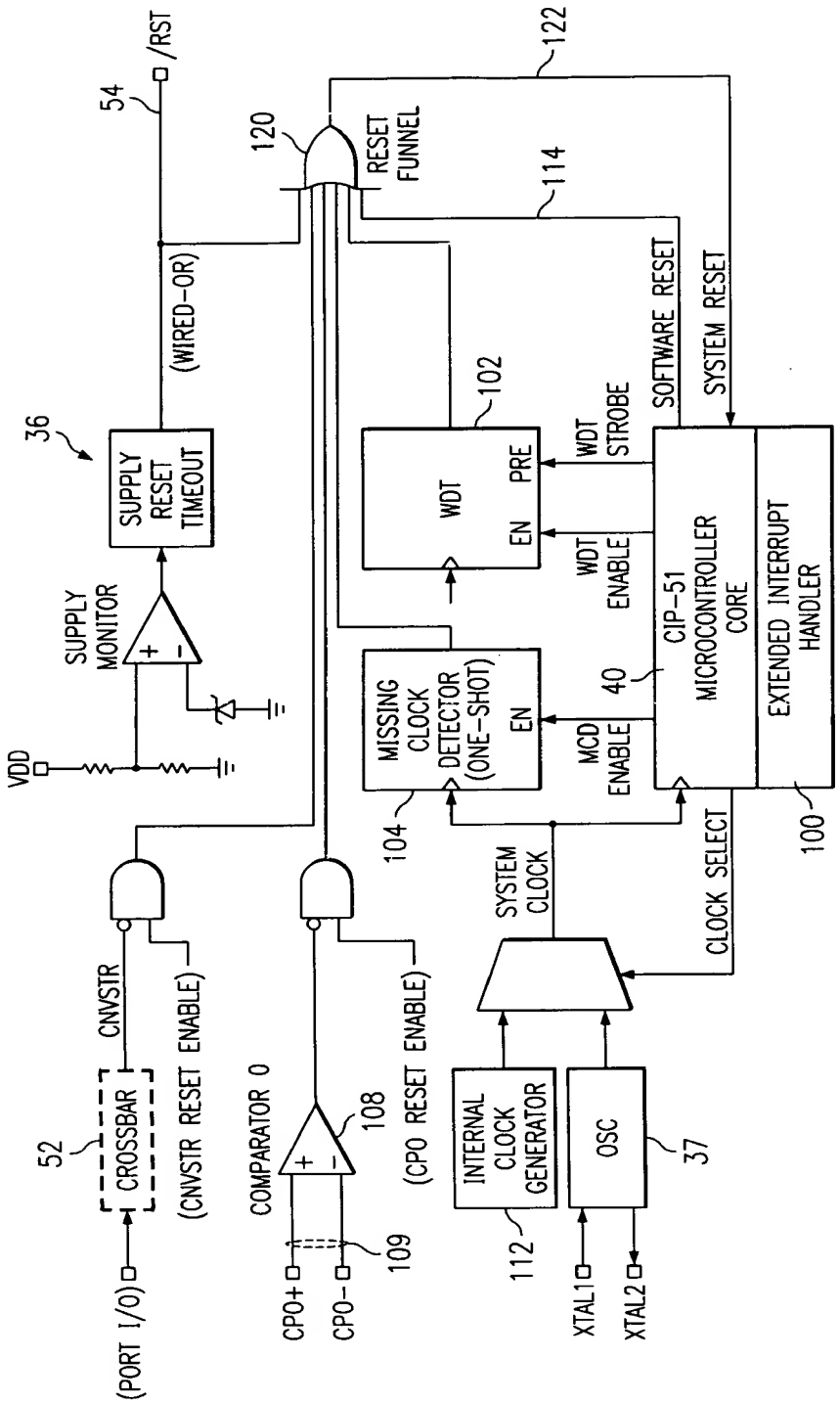

/RST
54
120
RESET FUNNEL
122
114
(WIRED-OR)
36
SUPPLY RESET TIMEOUT
SUPPLY MONITOR
VDD
102
WDT
PRE
EN
WDT STROBE
WDT ENABLE
SOFTWARE RESET
SYSTEM RESET
CIP-51 MICROCONTROLLER CORE
EXTENDED INTERRUPT HANDLER
MISSING CLOCK DETECTOR (ONE-SHOT)
EN
MCD ENABLE
40
104
100
SYSTEM CLOCK
CLOCK SELECT
CNVSTR
(CNVSTR RESET ENABLE)
(CP0 RESET ENABLE)
52
CROSSBAR
(PORT I/O)
COMPARATOR 0
108
109
CP0+
CP0-
INTERNAL CLOCK GENERATOR
112
OSC
37
XTAL1
XTAL2

FIG. 3

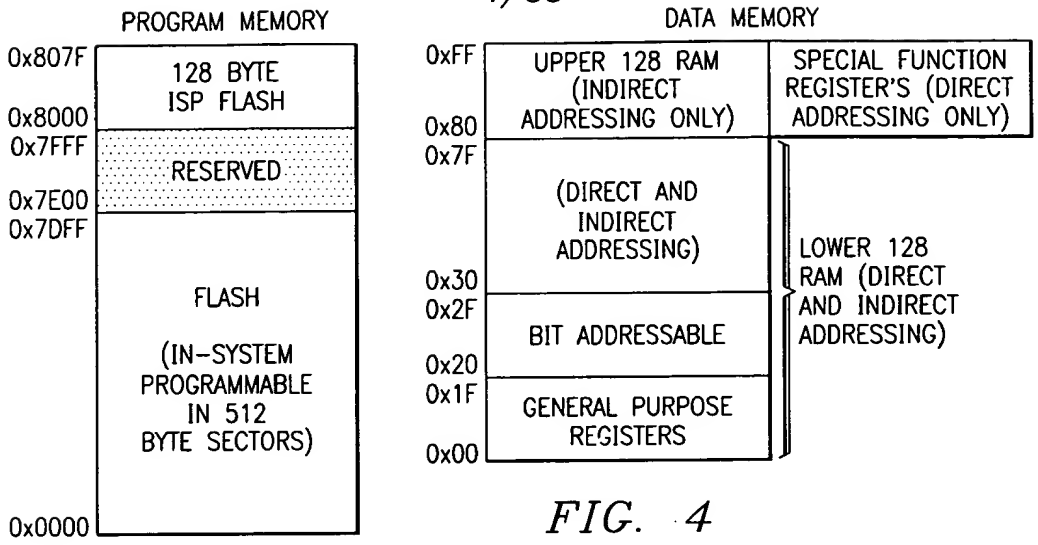

PROGRAM MEMORY
0x807F
128 BYTE ISP FLASH
0x8000
0x7FFF
RESERVED
0x7E00
0x7DFF
FLASH
(IN-SYSTEM PROGRAMMABLE IN 512 BYTE SECTORS)
0x0000
DATA MEMORY
0xFF
UPPER 128 RAM (INDIRECT ADDRESSING ONLY)
SPECIAL FUNCTION REGISTER'S (DIRECT ADDRESSING ONLY)
0x80
0x7F
(DIRECT AND INDIRECT ADDRESSING)
0x30
0x2F
BIT ADDRESSABLE
0x20
0x1F
GENERAL PURPOSE REGISTERS
0x00
LOWER 128 RAM (DIRECT AND INDIRECT ADDRESSING)

FIG. 4

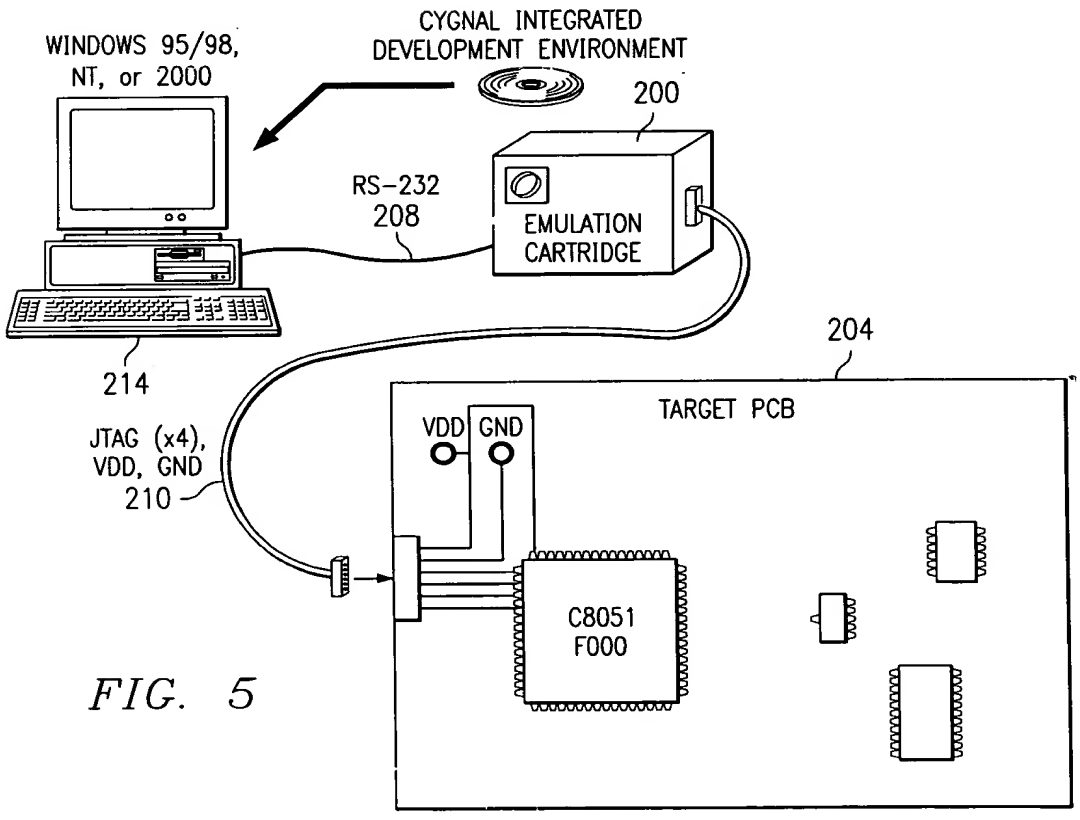
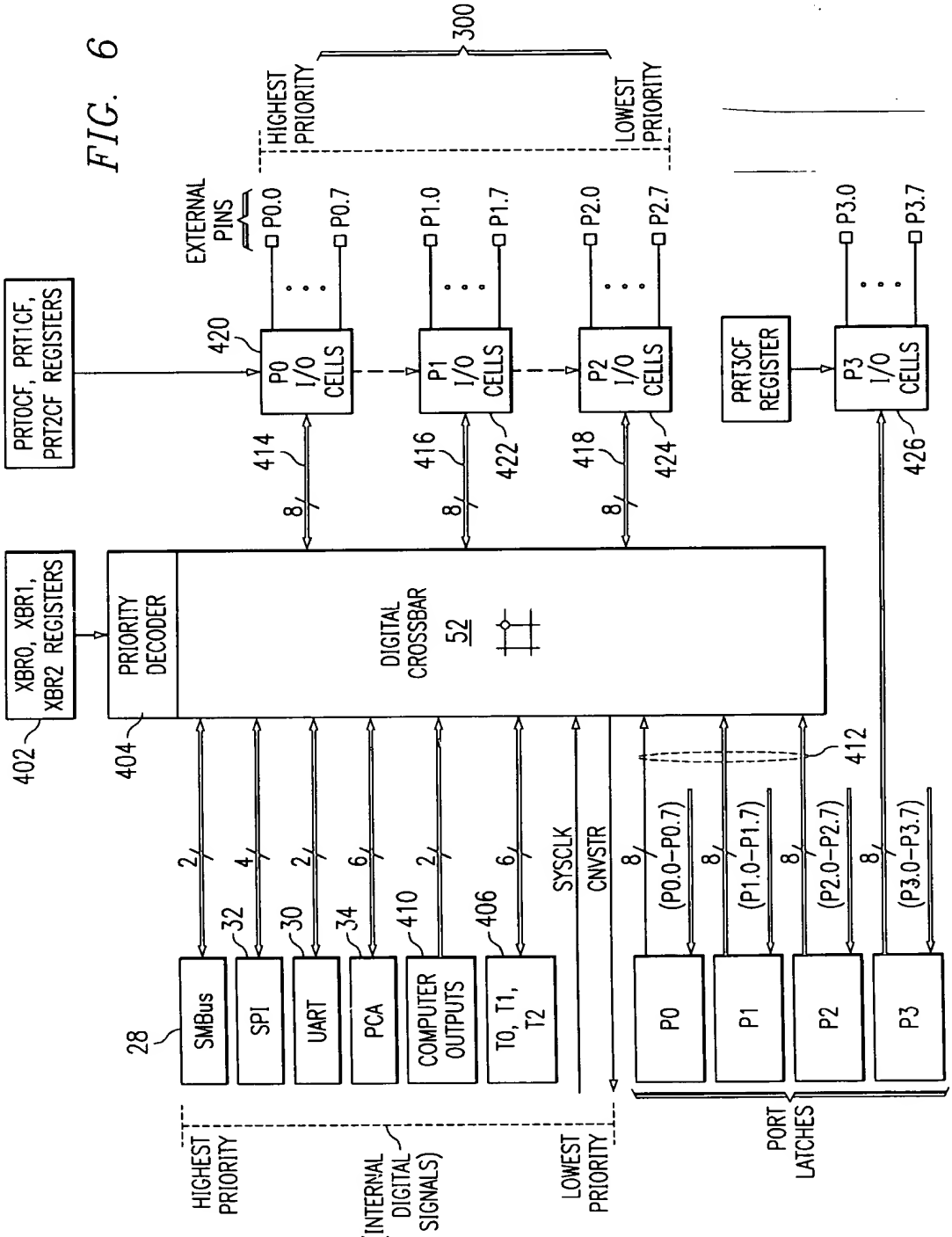

WINDOWS 95/98, NT, or 2000
CYGNAL INTEGRATED DEVELOPMENT ENVIRONMENT
200
RS-232
208
EMULATION CARTRIDGE
214
204
TARGET PCB
JTAG (x4), VDD, GND
210
VDD
GND
C8051
F000

FIG. 5

FIG. 6


300
HIGHEST PRIORITY
LOWEST PRIORITY
EXTERNAL PINS
P0.0
P0.7
P1.0
P1.7
P2.0
P2.7
P3.0
P3.7
PRT0CF, PRT1CF, PRT2CF REGISTERS
PRT3CF REGISTER
420
P0 I/O CELLS
P1 I/O CELLS
P2 I/O CELLS
P3 I/O CELLS
414
416
418
422
424
426
8
XBR0, XBR1, XBR2 REGISTERS
PRIORITY DECODER
DIGITAL CROSSBAR 52
402
404
412
2
4
32
30
34
410
406
SYSCLK
CNVSTR
8
(P0.0–P0.7)
(P1.0–P1.7)
(P2.0–P2.7)
(P3.0–P3.7)
28
SMBus
SPI
UART
PCA
COMPUTER OUTPUTS
T0, T1, T2
P0
P1
P2
P3
HIGHEST PRIORITY
(INTERNAL DIGITAL SIGNALS)
LOWEST PRIORITY
PORT LATCHES

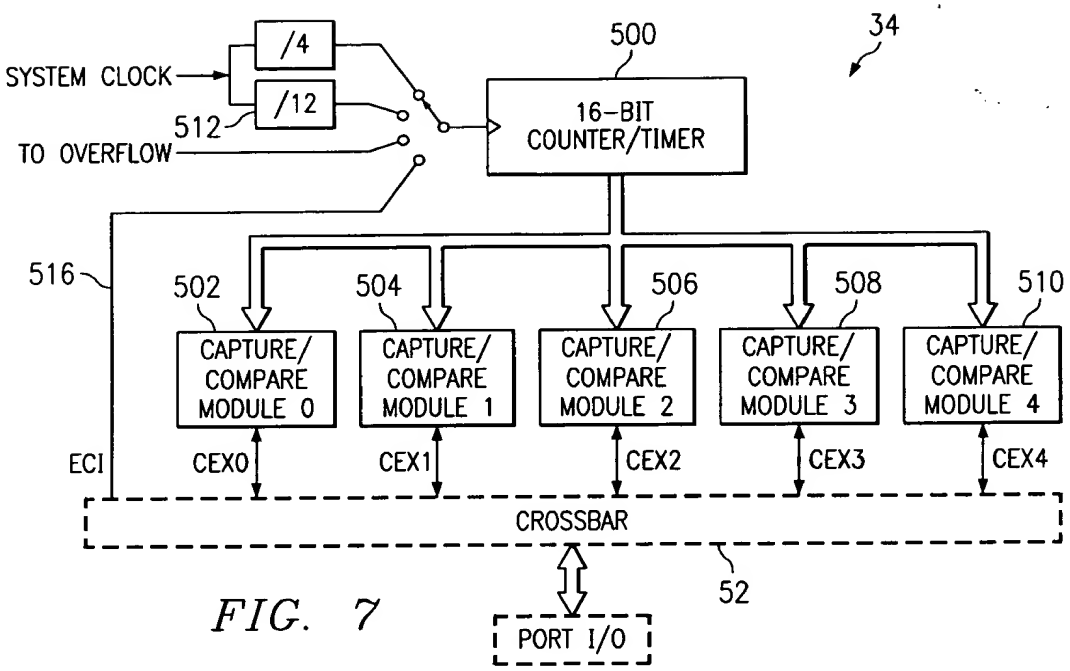

34
500
/4
/12
SYSTEM CLOCK
512
TO OVERFLOW
16-BIT
COUNTER/TIMER
516
502
504
506
508
510
CAPTURE/
COMPARE
MODULE 0
CAPTURE/
COMPARE
MODULE 1
CAPTURE/
COMPARE
MODULE 2
CAPTURE/
COMPARE
MODULE 3
CAPTURE/
COMPARE
MODULE 4
ECI
CEX0
CEX1
CEX2
CEX3
CEX4
CROSSBAR
52
PORT I/O

FIG. 7

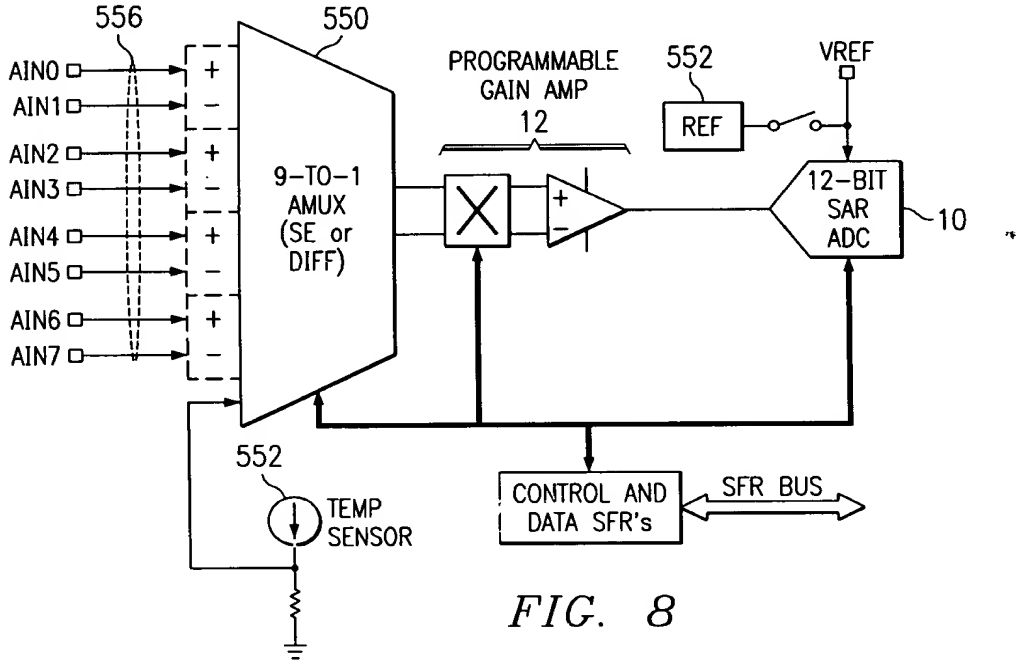

556
550
AIN0
AIN1
AIN2
AIN3
AIN4
AIN5
AIN6
AIN7
9-TO-1
AMUX
(SE or
DIFF)
PROGRAMMABLE
GAIN AMP
12
552
REF
VREF
12-BIT
SAR
ADC
10
552
TEMP
SENSOR
CONTROL AND
DATA SFR's
SFR BUS

FIG. 8

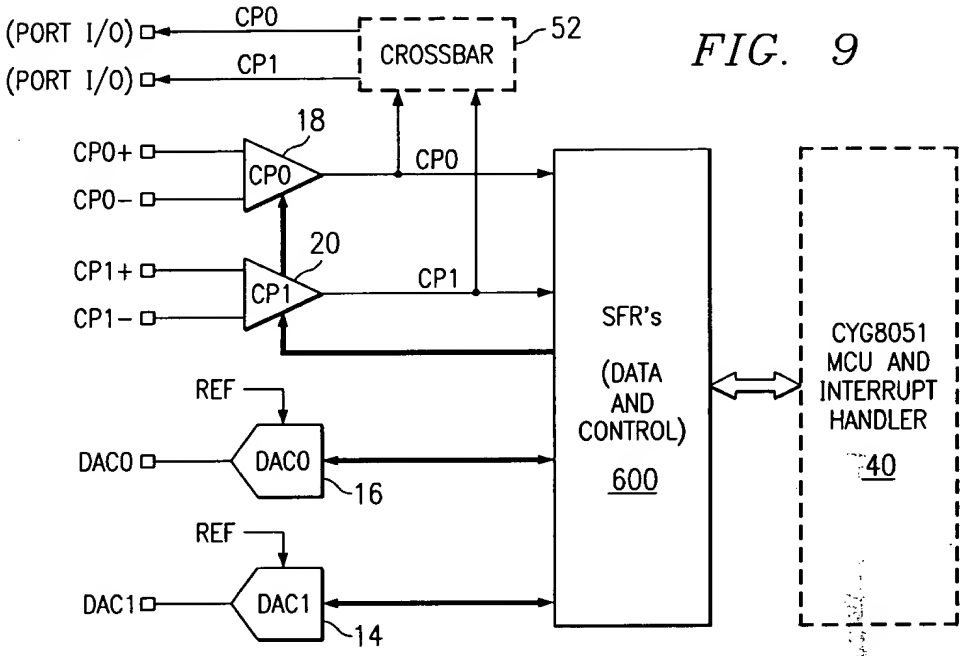
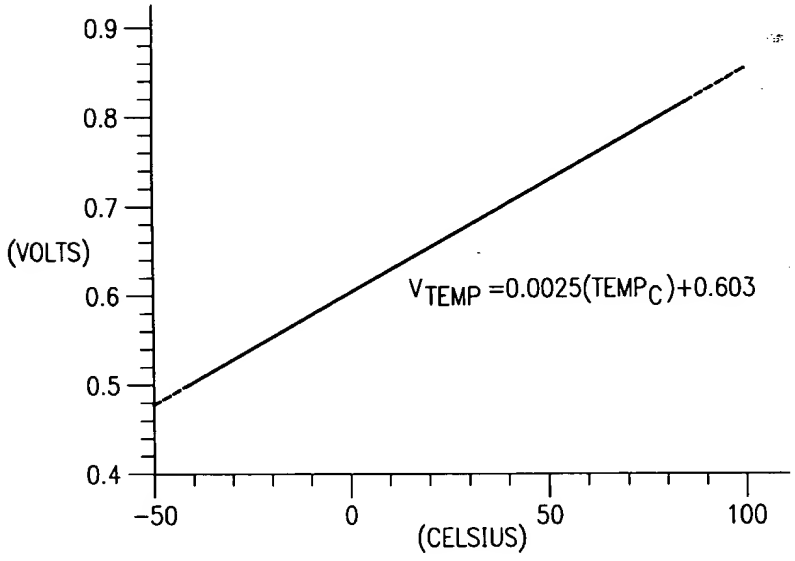

(PORT I/O)
(PORT I/O)
CP0
CP1
CROSSBAR
52
18
CP0+
CP0-
CP0
CP0
20
CP1+
CP1-
CP1
CP1
SFR's
(DATA
AND
CONTROL)
600
CYG8051
MCU AND
INTERRUPT
HANDLER
40
REF
DAC0
DAC0
16
REF
DAC1
DAC1
14

FIG. 9

FIG. 12


0.9
0.8
0.7
(VOLTS)
0.6
0.5
0.4
V_{TEMP} =0.0025($TEMP_C$)+0.603
-50
0
50
100
(CELSIUS)

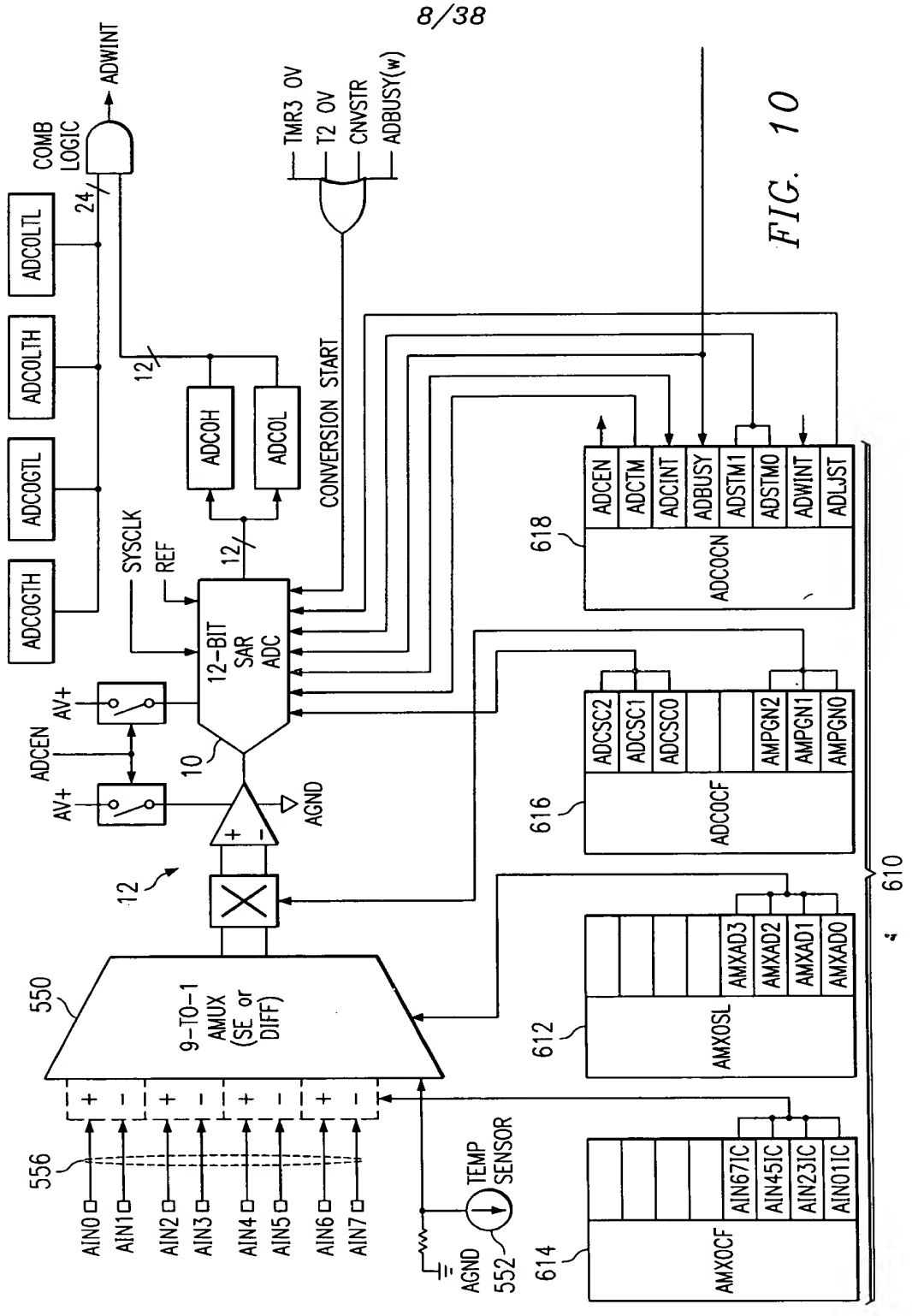

ADWINT
COMB LOGIC
24
ADCOLTL
ADCOLTH
ADCOGTL
ADCOGTH
12
ADCOH
ADCOL
TMR3 OV
T2 OV
CNVSTR
ADBUSY(w)
CONVERSION START
SYSCLK
REF
12
12-BIT SAR ADC
10
AV+
ADCEN
AV+
AGND
12
550
9-TO-1 AMUX (SE or DIFF)
556
AIN0
AIN1
AIN2
AIN3
AIN4
AIN5
AIN6
AIN7
TEMP SENSOR
AGND
552
614
AMX0CF
AIN67IC
AIN45IC
AIN23IC
AIN01IC
612
AMX0SL
AMXAD3
AMXAD2
AMXAD1
AMXAD0
616
ADC0CF
ADCSC2
ADCSC1
ADCSC0
AMPGN2
AMPGN1
AMPGN0
618
ADC0CN
ADCEN
ADCTM
ADCINT
ADBUSY
ADSTM1
ADSTM0
ADWINT
ADLJST
610

FIG. 10

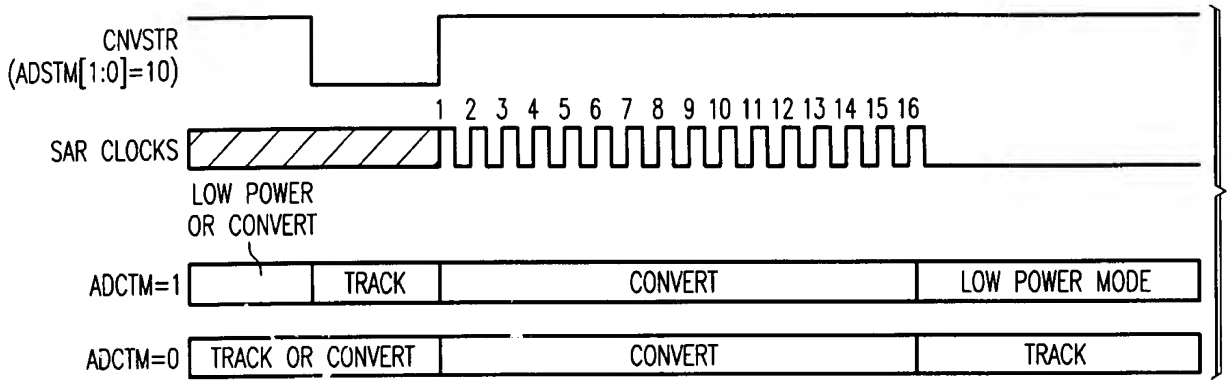


FIG. 11A

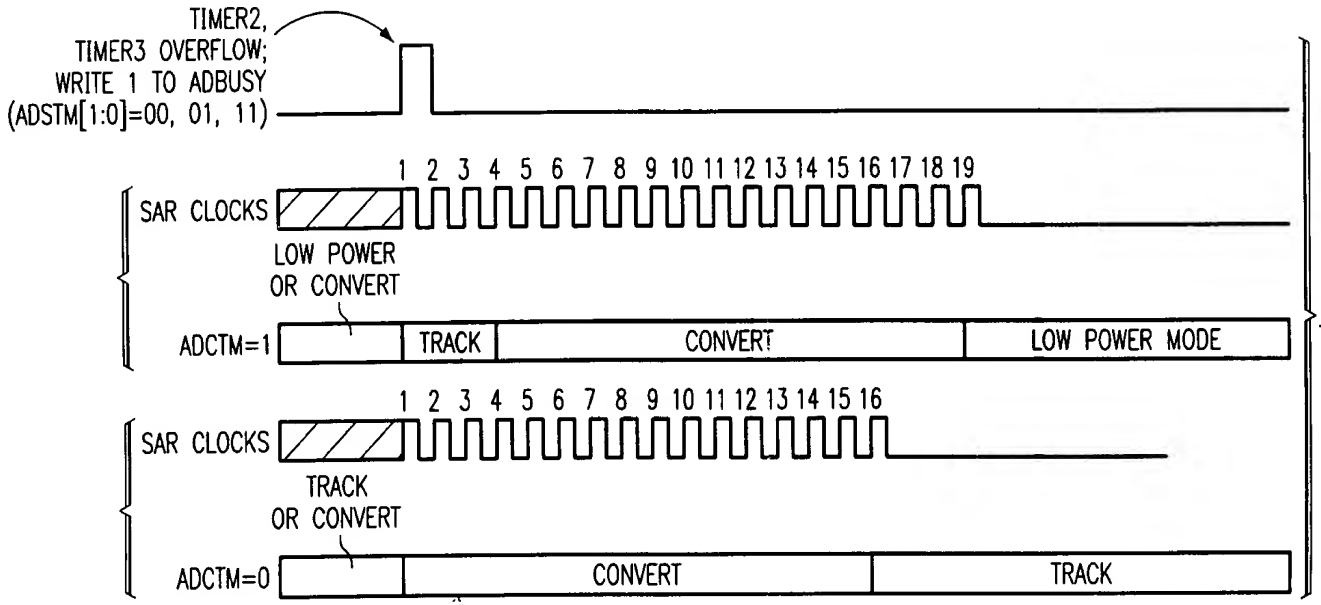


FIG. 11B

INPUT VOLTAGE (AD0–AGND)	ADC DATA WORD	
REF x (4095/4096)	0x0FFF	ADWINT NOT AFFECTED
	0x0201	
REF x (512/4096)	0x0200	ADC0LTH:ADC0LTL
	0x01FF	ADWINT=1
	0x0101	
REF x (256/4096)	0x0100	ADC0GTH:ADC0GTL
	0x00FF	ADWINT NOT AFFECTED
0	0x0000	

GIVEN:

AMX0SL=0x00, AMX0CF=0x00, ADLJST=0,
ADC0LTH:ADC0LTL=0x0200,
ADC0GTH:ADC0GTL=0x0100.

AN ADC END OF CONVERSION WILL CAUSE AN ADC WINDOW COMPARE INTERRUPT (ADWINT=1) IF THE RESULTING ADC DATA WORD IS < 0x0200 AND > 0x0100.

INPUT VOLTAGE (AD0–AGND)	ADC DATA WORD	
REF x (4095/4096)	0x0FFF	ADWINT=1
	0x0201	
REF x (512/4096)	0x0200	ADC0GTH:ADC0GTL
	0x01FF	ADWINT NOT AFFECTED
	0x0101	
REF x (256/4096)	0x0100	ADC0LTH:ADC0LTL
	0x00FF	ADWINT=1
0	0x0000	

GIVEN:

AMX0SL=0x00, AMX0CF=0x00, ADLJST=0,
ADC0LTH:ADC0LTL=0x0100,
ADC0GTH:ADC0GTL=0x0200.

AN ADC END OF CONVERSION WILL CAUSE AN ADC WINDOW COMPARE INTERRUPT (ADWINT=1) IF THE RESULTING ADC DATA WORD IS < 0x0100 OR > 0x0200.

TO FIG. 13B

FIG. 13A

FIG. 13B

FROM FIG. 13A

INPUT VOLTAGE (AD0–AD1)	ADC DATA WORD	
REF x (4095/4096)	0x07FF	ADWINT NOT AFFECTED
	0x0101	
REF x (256/4096)	0x0100	ADC0LTH:ADC0LTL
	0x00FF	ADWINT=1
	0x0000	
REF x (−1/4096)	0xFFFF	ADC0GTH:ADC0GTL
	0xFFFE	ADWINT NOT AFFECTED
−REF	0xF800	

GIVEN:

AMX0SL=0x00, AMX0CF=0x01, ADLJST=0,
ADC0LTH:ADC0LTL=0x0100,
ADC0GTH:ADC0GTL=0xFFFF.

AN ADC END OF CONVERSION WILL CAUSE AN ADC WINDOW COMPARE INTERRUPT (ADWINT=1) IF THE RESULTING ADC DATA WORD IS < 0x0100 AND > 0xFFFF. (TWO'S COMPLEMENT MATH.)

INPUT VOLTAGE (AD0–AD1)	ADC DATA WORD	
REF x (4095/4096)	0x07FF	ADWINT=1
	0x0101	
REF x (256/4096)	0x0100	ADC0GTH:ADC0GTL
	0x00FF	ADWINT NOT AFFECTED
	0x0000	
REF x (−1/4096)	0xFFFF	ADC0LTH:ADC0LTL
	0xFFFE	ADWINT=1
−REF	0xF800	

GIVEN:

AMX0SL=0x00, AMX0CF=0x01, ADLJST=0,
ADC0LTH:ADC0LTH=0xFFFF,
ADC0GTH:ADC0GTL=0x0100.

AN ADC END OF CONVERSION WILL CAUSE AN ADC WINDOW COMPARE INTERRUPT (ADWINT=1) IF THE RESULTING ADC DATA WORD IS < 0xFFFF OR > 0x0100. (TWO'S COMPLEMENT MATH.)

INPUT VOLTAGE (AD0–AGND)	ADC DATA WORD	
REF x (4095/4096)	0xFFF0	ADWINT NOT AFFECTED
	0x2010	
REF x (512/4096)	0x2000	ADCOLTH:ADCOLTL
	0x1FF0	ADWINT=1
	0x1010	
REF x (256/4096)	0x1000	ADCOGTH:ADCOGTL
	0x0FF0	ADWINT NOT AFFECTED
0	0x0000	

GIVEN:

AMX0SL=0x00, AMX0CF=0x00, ADLJST=1,
ADCOLTH:ADCOLTL=0x2000,
ADCOGTH:ADCOGTL=0x1000.

AN ADC END OF CONVERSION WILL CAUSE AN ADC WINDOW COMPARE INTERRUPT (ADWINT=1) IF THE RESULTING ADC DATA WORD IS < 0x2000 AND > 0x1000.

INPUT VOLTAGE (AD0–AGND)	ADC DATA WORD	
REF x (4095/4096)	0xFFF0	ADWINT=1
	0x2010	
REF x (512/4096)	0x2000	ADCOGTH:ADCOGTL
	0x1FF0	ADWINT NOT AFFECTED
	0x1010	
REF x (256/4096)	0x1000	ADCOLTH:ADCOLTL
	0x0FF0	ADWINT=1
0	0x0000	

GIVEN:

AMX0SL=0x00, AMX0CF=0x00, ADLJST=1,
ADCOLTH:ADCOLTL=0x1000,
ADCOGTH:ADCOGTL=0x2000.

AN ADC END OF CONVERSION WILL CAUSE AN ADC WINDOW COMPARE INTERRUPT (ADWINT=1) IF THE RESULTING ADC DATA WORD IS < 0x1000 OR > 0x2000.

TO FIG. 14B

FIG. 14A

FROM FIG. 14A

FIG. 14B

INPUT VOLTAGE (AD0–AD1)	ADC DATA WORD	
REF x (4095/4096)	0x7FF0	ADWINT NOT AFFECTED
	0x1010	
REF x (256/4096)	0x1000	ADCOLTH:ADCOLTL
	0x0FF0	ADWINT=1
	0x0000	
REF x (−1/4096)	0xFFF0	ADCOGTH:ADCOGTL
	0xFFE0	ADWINT NOT AFFECTED
−REF	0x8000	

GIVEN:

AMX0SL=0x00, AMX0CF=0x01, ADLJST=1,
ADCOLTH:ADCOLTL=0x1000,
ADCOGTH:ADCOGTL=0xFFF0.

AN ADC END OF CONVERSION WILL CAUSE AN ADC WINDOW COMPARE INTERRUPT (ADWINT=1) IF THE RESULTING ADC DATA WORD IS < 0x1000 AND > 0xFFF0. (TWO'S COMPLEMENT MATH.)

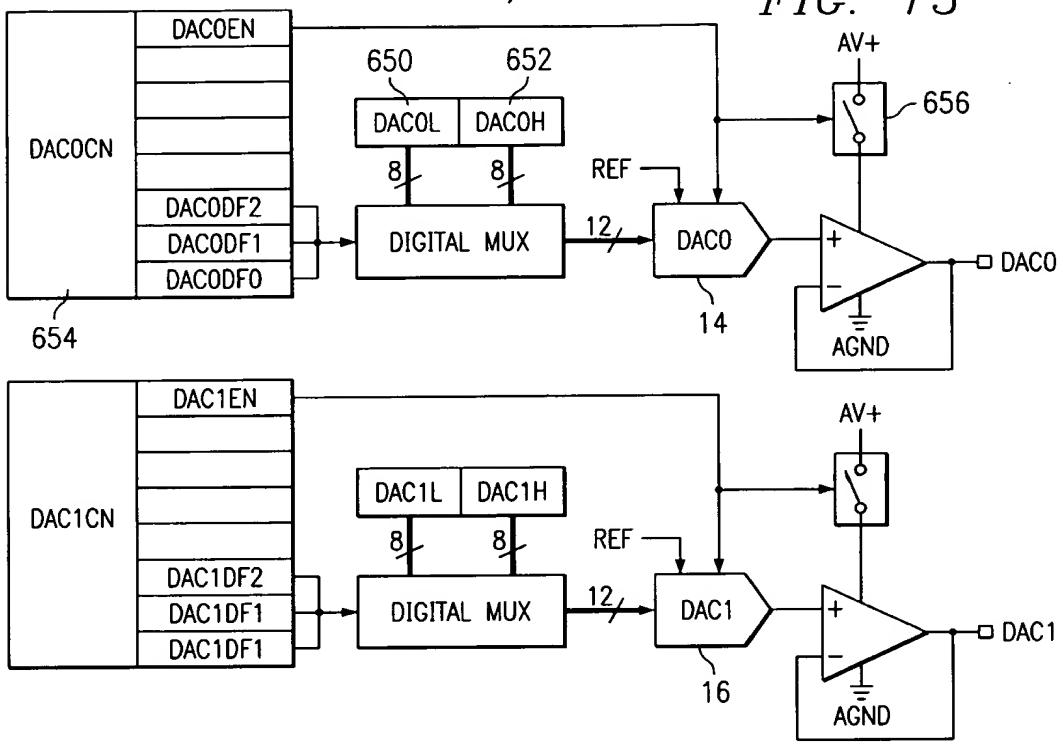
INPUT VOLTAGE (AD0–AD1)	ADC DATA WORD	
REF x (4095/4096)	0x7FF0	ADWINT=1
	0x1010	
REF x (256/4096)	0x1000	ADCOGTH:ADCOGTL
	0x0FF0	ADWINT NOT AFFECTED
	0x0000	
REF x (−1/4096)	0xFFF0	ADCOLTH:ADCOLTL
	0xFFE0	ADWINT=1
−REF	0x8000	

GIVEN:

AMX0SL=0x00, AMX0CF=0x01, ADLJST=1,
ADCOLTH:ADCOLTH=0xFFF0,
ADCOGTH:ADCOGTL=0x1000.

AN ADC END OF CONVERSION WILL CAUSE AN ADC WINDOW COMPARE INTERRUPT (ADWINT=1) IF THE RESULTING ADC DATA WORD IS < 0xFFF0 OR > 0x1000. (TWO'S COMPLEMENT MATH.)

FIG. 15


DACOEN
DACOCN
DACODF2
DACODF1
DACODF0
654
650
652
DACOL
DACOH
8
8
REF
DIGITAL MUX
12
DACO
14
AV+
656
DACO
AGND
DAC1EN
DAC1CN
DAC1DF2
DAC1DF1
DAC1DF1
DAC1L
DAC1H
8
8
REF
DIGITAL MUX
12
DAC1
16
AV+
DAC1
AGND

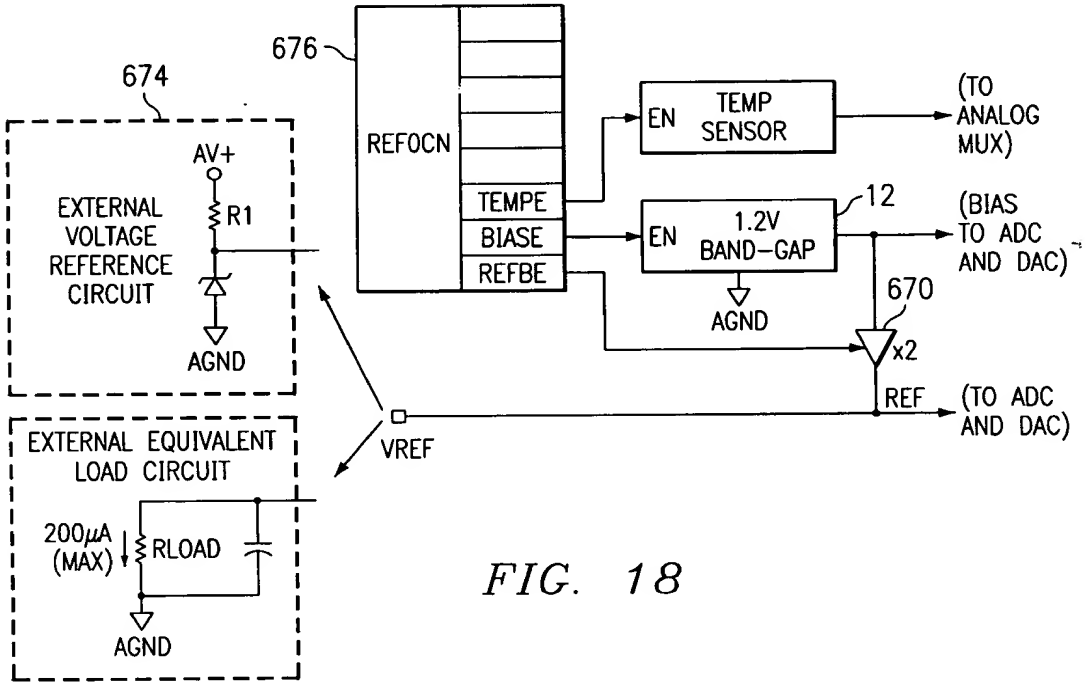

676
674
REFOCN
TEMPE
BIASE
REFBE
EN
TEMP SENSOR
(TO ANALOG MUX)
EN
1.2V BAND-GAP
12
(BIAS TO ADC AND DAC)
AGND
670
x2
REF
(TO ADC AND DAC)
AV+
R1
EXTERNAL VOLTAGE REFERENCE CIRCUIT
AGND
VREF
EXTERNAL EQUIVALENT LOAD CIRCUIT
200μA (MAX)
RLOAD
AGND

FIG. 18

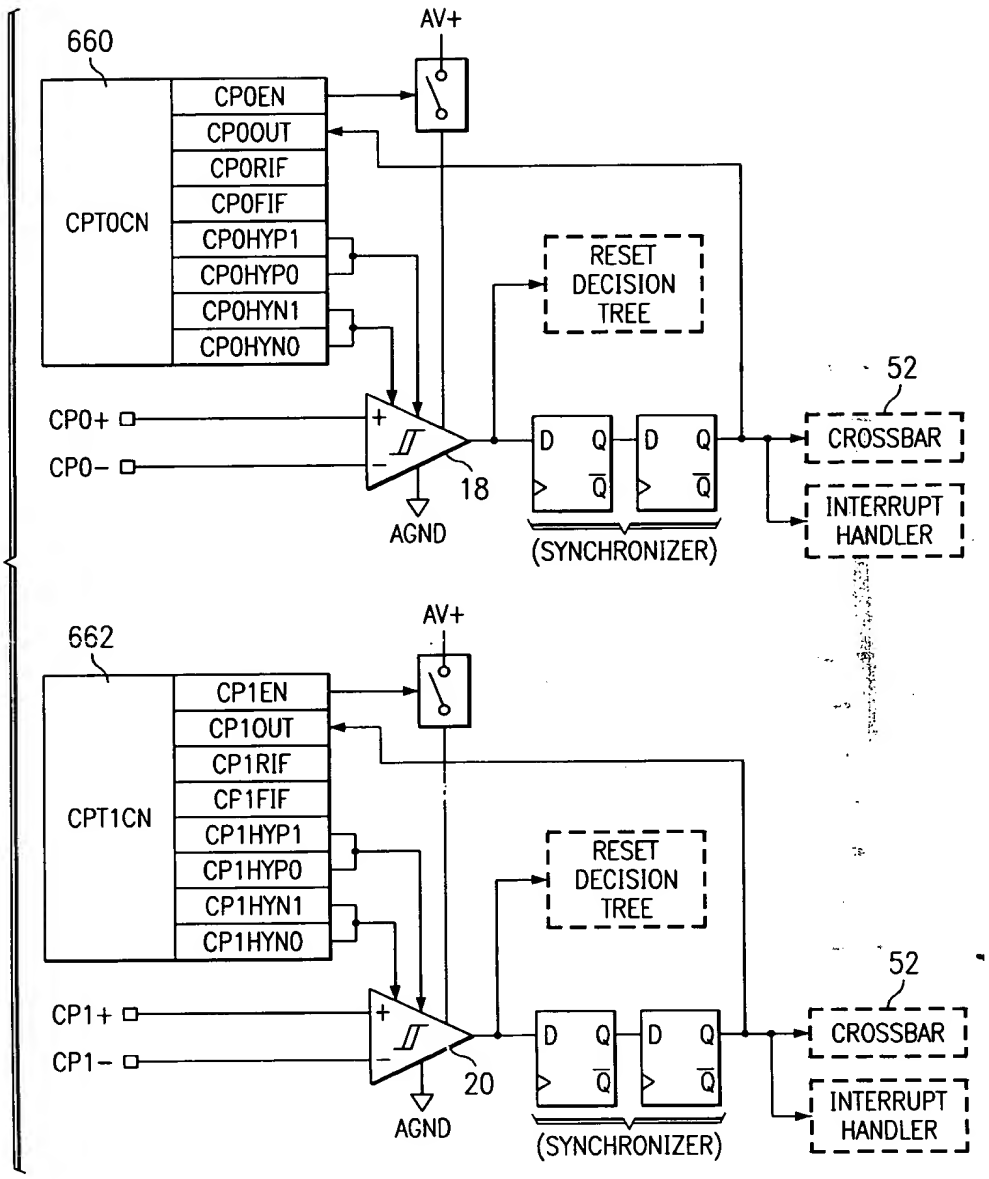

660
AV+
CP0EN
CP0OUT
CP0RIF
CP0FIF
CP0HYP1
CP0HYP0
CP0HYN1
CP0HYN0
CPT0CN
RESET DECISION TREE
52
CP0+
CP0-
18
AGND
D Q
Q
(SYNCHRONIZER)
CROSSBAR
INTERRUPT HANDLER
662
AV+
CP1EN
CP1OUT
CP1RIF
CP1FIF
CP1HYP1
CP1HYP0
CP1HYN1
CP1HYN0
CPT1CN
RESET DECISION TREE
52
CP1+
CP1-
20
AGND
(SYNCHRONIZER)
CROSSBAR
INTERRUPT HANDLER

FIG. 16

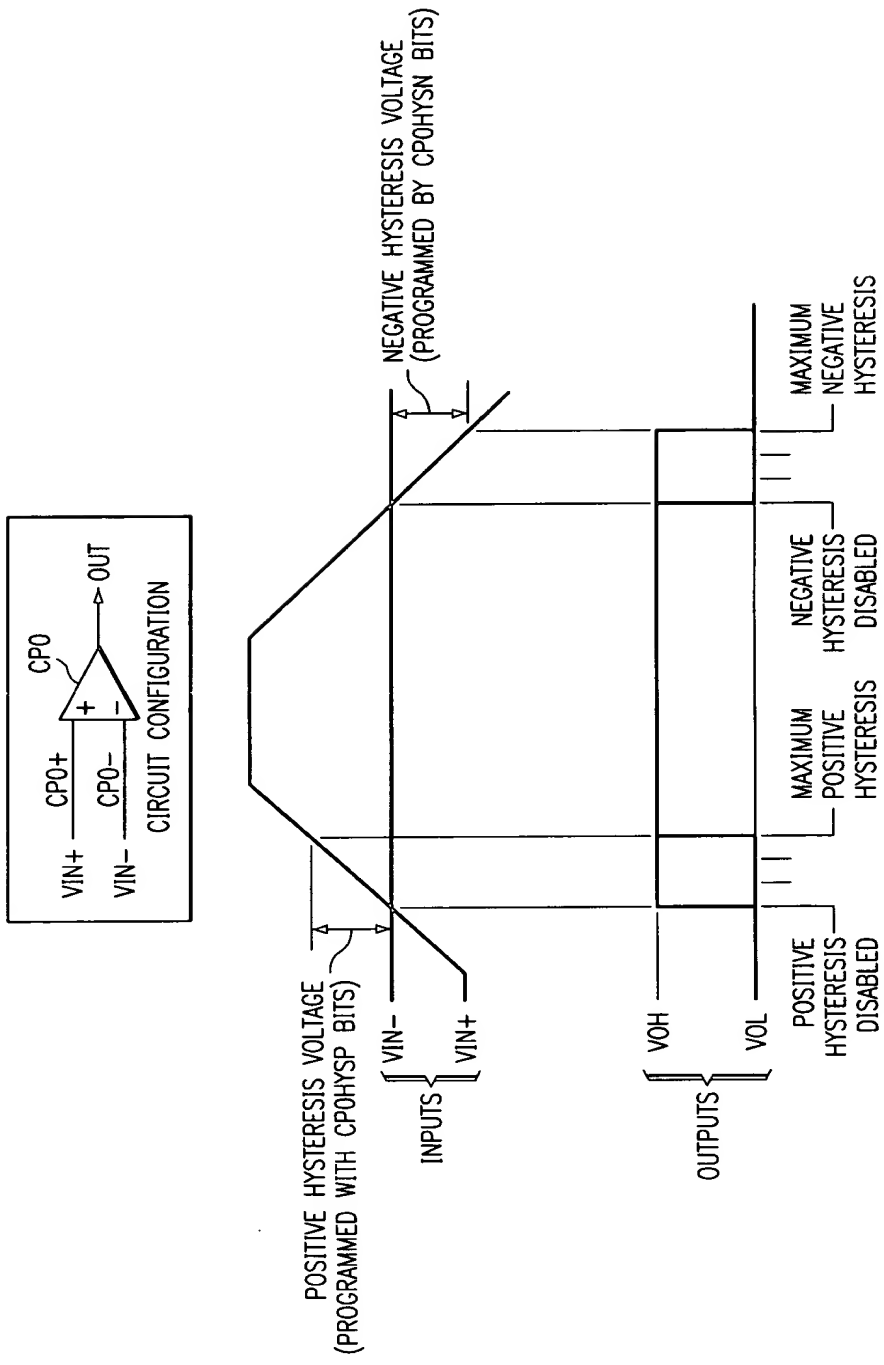
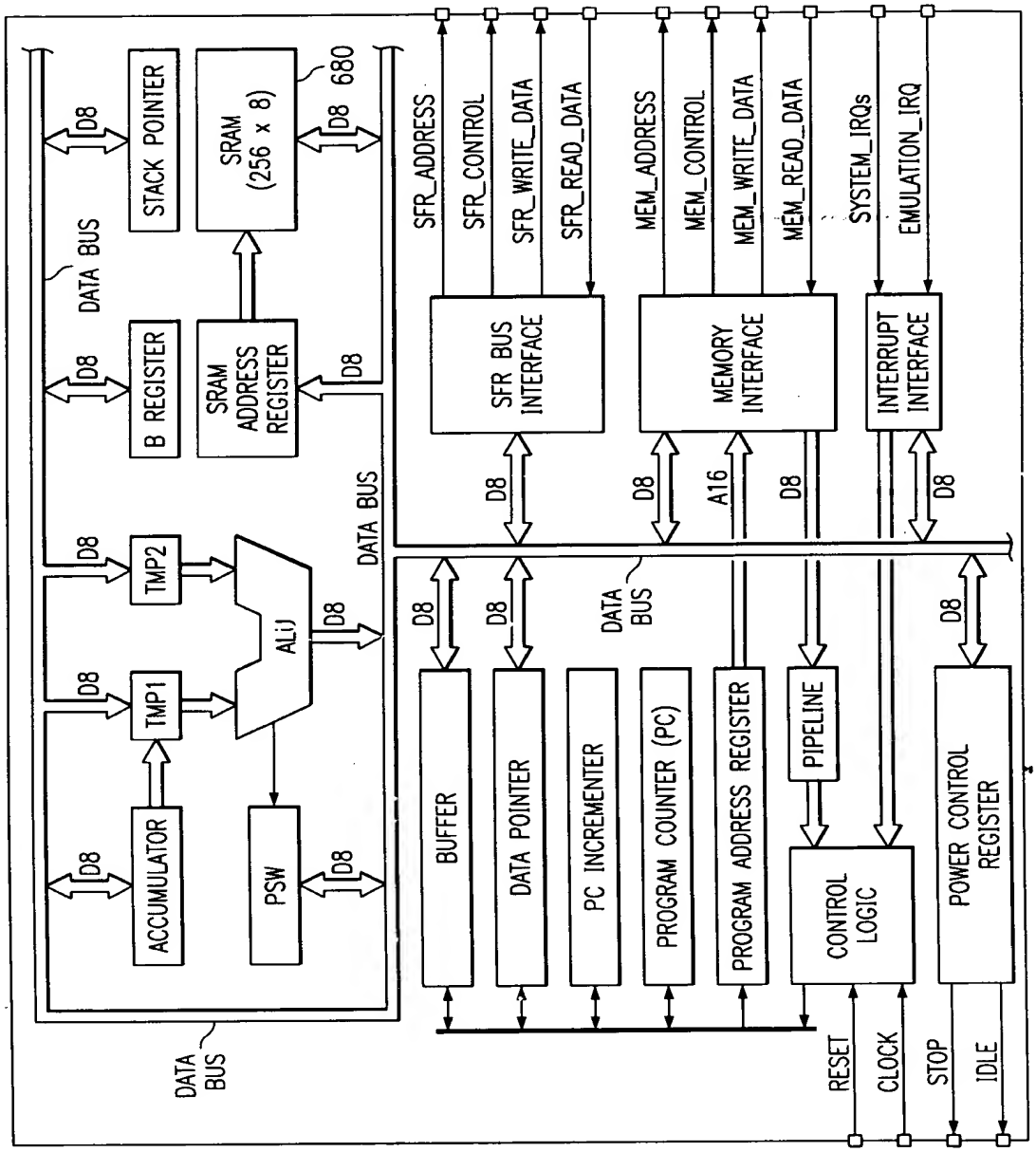

CPO
OUT
CPO+
CPO-
VIN+
VIN-
CIRCUIT CONFIGURATION
NEGATIVE HYSTERESIS VOLTAGE
(PROGRAMMED BY CPOHYSN BITS)
MAXIMUM
NEGATIVE
HYSTERESIS
NEGATIVE
HYSTERESIS
DISABLED
MAXIMUM
POSITIVE
HYSTERESIS
POSITIVE
HYSTERESIS
DISABLED
POSITIVE HYSTERESIS VOLTAGE
(PROGRAMMED WITH CPOHYSP BITS)
VIN-
VIN+
INPUTS
VOH
VOL
OUTPUTS

FIG. 17

FIG. 19


DATA BUS
STACK POINTER
SRAM (256 x 8)
680
B REGISTER
SRAM ADDRESS REGISTER
TMP2
TMP1
ALU
ACCUMULATOR
PSW
D8
SFR_ADDRESS
SFR_CONTROL
SFR_WRITE_DATA
SFR_READ_DATA
MEM_ADDRESS
MEM_CONTROL
MEM_WRITE_DATA
MEM_READ_DATA
SYSTEM_IRQs
EMULATION_IRQ
SFR BUS INTERFACE
MEMORY INTERFACE
INTERRUPT INTERFACE
A16
BUFFER
DATA POINTER
PC INCREMENTER
PROGRAM COUNTER (PC)
PROGRAM ADDRESS REGISTER
PIPELINE
CONTROL LOGIC
POWER CONTROL REGISTER
RESET
CLOCK
STOP
IDLE

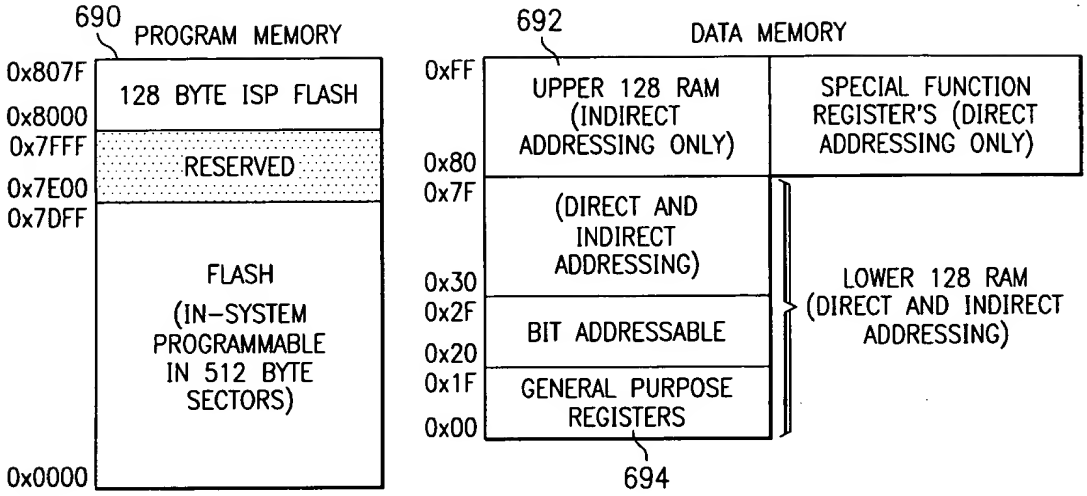

690
PROGRAM MEMORY
0x807F
0x8000
0x7FFF
0x7E00
0x7DFF
0x0000
128 BYTE ISP FLASH
RESERVED
FLASH
(IN-SYSTEM PROGRAMMABLE IN 512 BYTE SECTORS)
692
DATA MEMORY
0xFF
0x80
0x7F
0x30
0x2F
0x20
0x1F
0x00
UPPER 128 RAM (INDIRECT ADDRESSING ONLY)
SPECIAL FUNCTION REGISTER'S (DIRECT ADDRESSING ONLY)
(DIRECT AND INDIRECT ADDRESSING)
BIT ADDRESSABLE
GENERAL PURPOSE REGISTERS
LOWER 128 RAM (DIRECT AND INDIRECT ADDRESSING)
694

FIG. 20

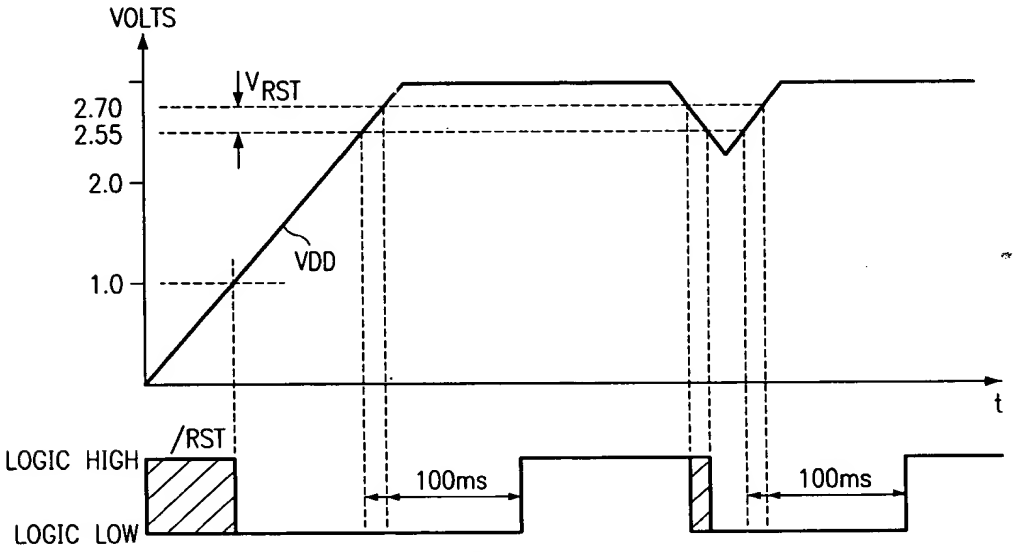
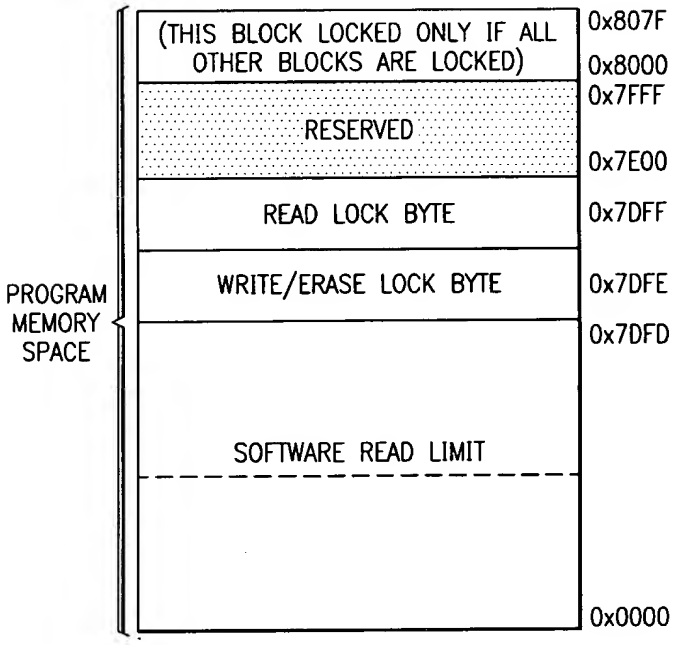

VOLTS
V_{RST}
2.70
2.55
2.0
1.0
VDD
t
/RST
LOGIC HIGH
LOGIC LOW
100ms
100ms

FIG. 22



READ AND WRITE/ ERASE SECURITY BITS. (BIT 7 IS MSB.)

BIT	MEMORY BLOCK
7	0x7000–0x7DFD
6	0x6000–0x6FFF
5	0x5000–0x5FFF
4	0x4000–0x4FFF
3	0x3000–0x3FFF
2	0x2000–0x2FFF
1	0x1000–0x1FFF
0	0x0000–0x0FFF

FLASH READ LOCK BYTE

BITS7–0: EACH BIT LOCKS A CORRESPONDING BLOCK OF MEMORY. (BIT 7 IS MSB.)
0: READ OPERATIONS ARE LOCKED (DISABLED) FOR CORRESPONDING BLOCK ACROSS THE JTAG INTERFACE.
1: READ OPERATIONS ARE UNLOCKED (ENABLED) FOR CORRESPONDING BLOCK ACCROSS THE JTAG INTERFACE.

FLASH WRITE/ERASE LOCK BYTE

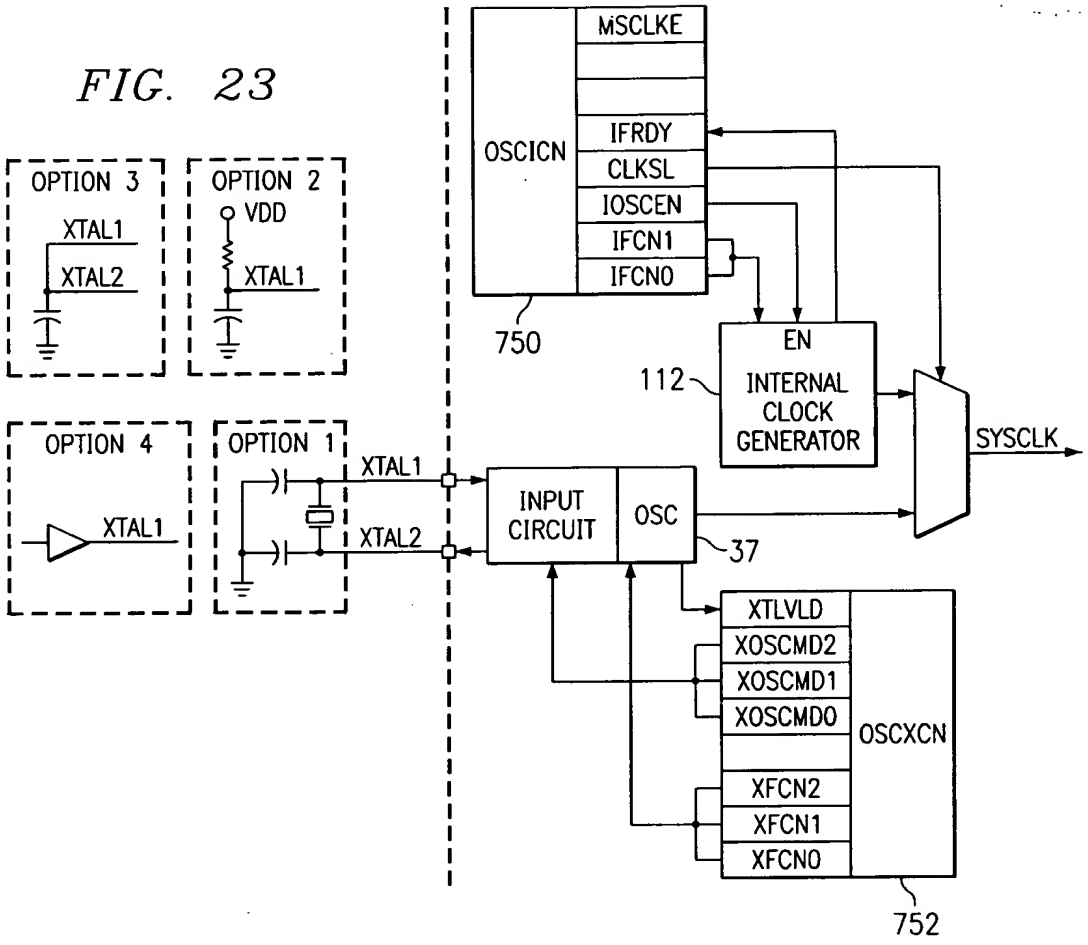
BITS 7–0: EACH BIT LOCKS A CORRESPONDING BLOCK OF MEMORY.
0: WRITE/ERASE OPERATIONS ARE LOCKED (DISABLED) FOR CORRESPONDING BLOCK ACROSS THE JTAG INTERFACE.
1: WRITE/ERASE OPERATIONS ARE UNLOCKED (ENABLED) FOR CORRESPONDING BLOCK ACROSS THE JTAG INTERFACE.

FLASH ACCESS LIMIT REGISTER (FLACL)

THE CONTENT OF THIS REGISTER IS USED AS THE HIGH BYTE OF THE 16-BIT SOFTWARE READ LIMIT ADDRESS. THE 16-BIT READ LIMIT ADDRESS VALUE IS CALCULATED AS 0xNN00 WHERE NN IS REPLACED BY CONTENT OF THIS REGISTER ON RESET. SOFTWARE RUNNING AT OR ABOVE THIS ADDRESS IS PROHIBITED FROM USING THE MOVX AND MOVC INSTRUCTIONS TO READ, WRITE, OR ERASE, LOCATIONS BELOW THIS ADDRESS. ANY ATTEMPTS TO READ LOCATIONS BELOW THIS LIMIT WILL RETURN THE VALUE 0x00.

FIG. 21

FIG. 23


OPTION 3
XTAL1
XTAL2
OPTION 2
VDD
XTAL1
OPTION 4
XTAL1
OPTION 1
XTAL1
XTAL2
OSCICN
MSCLKE
IFRDY
CLKSL
IOSCEN
IFCN1
IFCN0
750
EN
112
INTERNAL CLOCK GENERATOR
SYSCLK
INPUT CIRCUIT
OSC
37
XTLVLD
XOSCMD2
XOSCMD1
XOSCMD0
XFCN2
XFCN1
XFCN0
OSCXCN
752

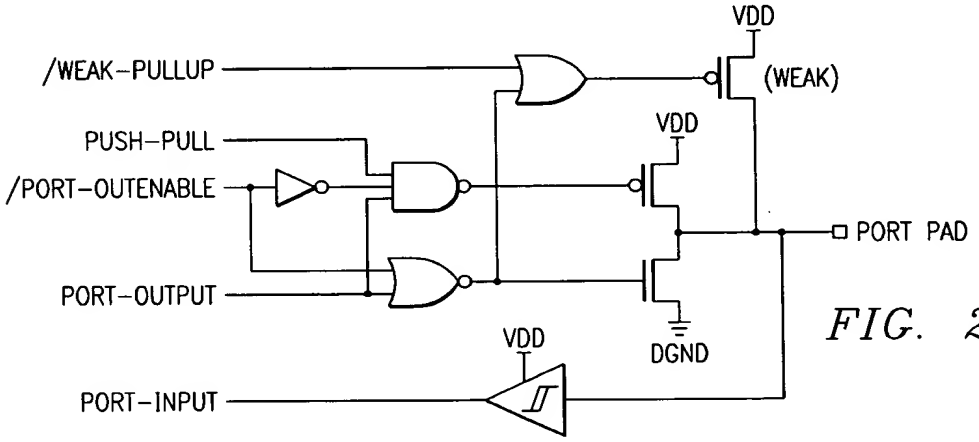
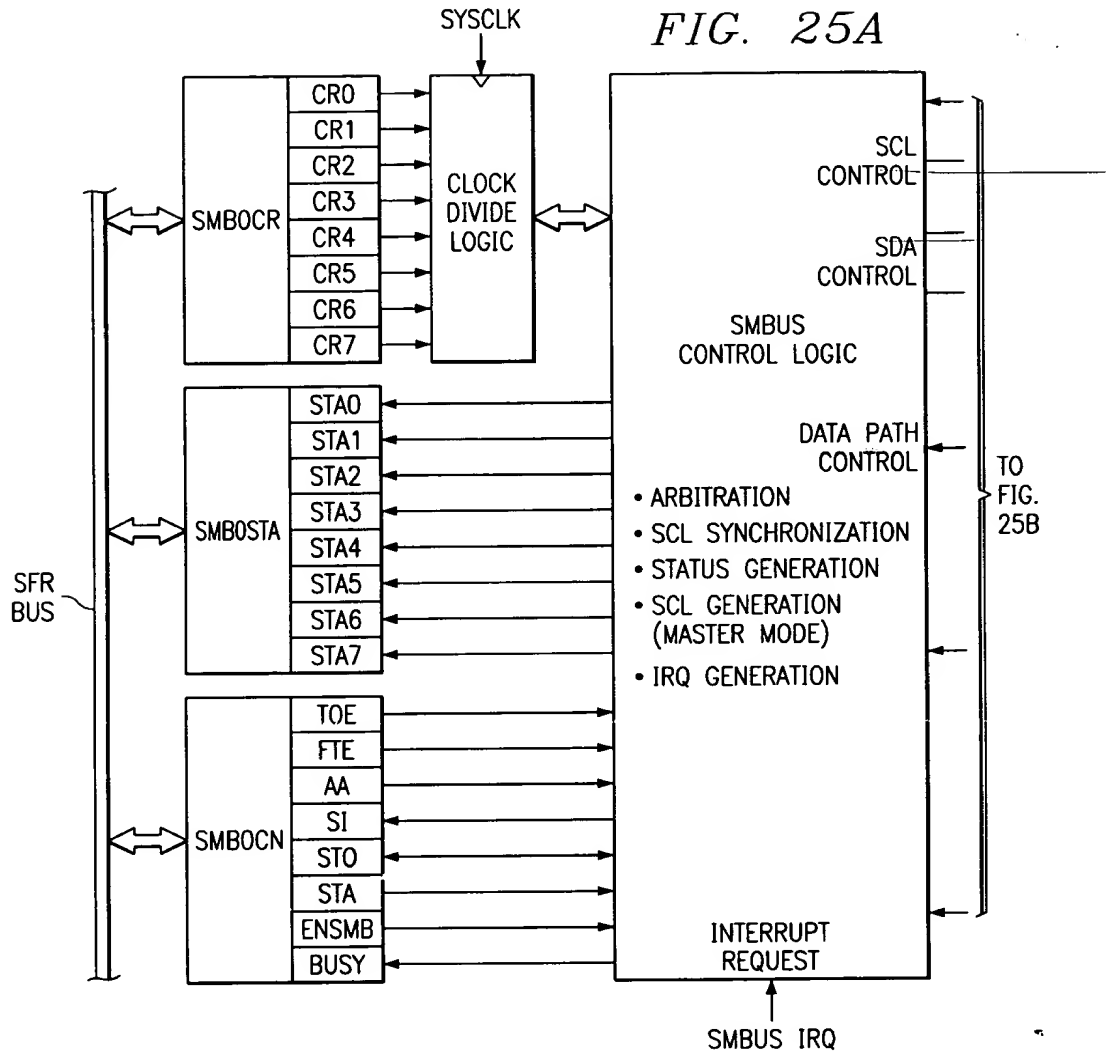

VDD
/WEAK-PULLUP
(WEAK)
PUSH-PULL
VDD
/PORT-OUTENABLE
PORT PAD
PORT-OUTPUT
DGND
VDD
PORT-INPUT

FIG. 24

FIG. 25A



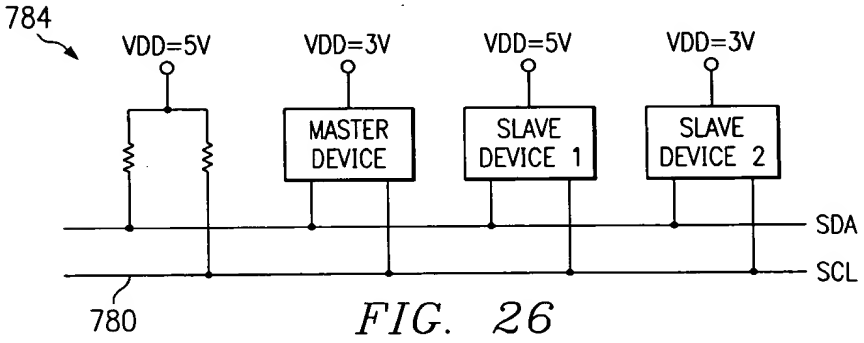


FIG. 26

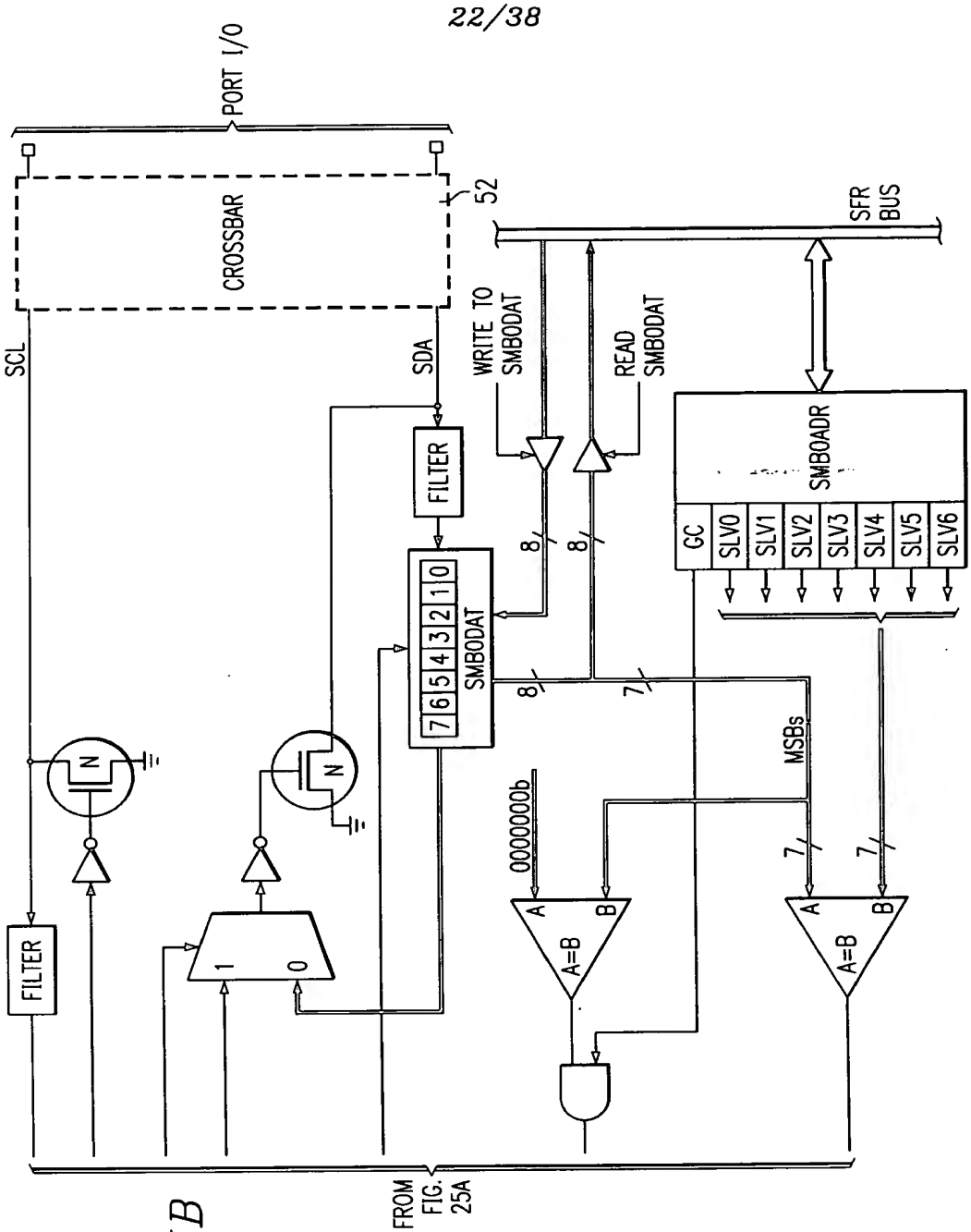

PORT I/O
CROSSBAR
52
SFR BUS
SCL
SDA
WRITE TO SMBODAT
READ SMBODAT
FILTER
SMBOADR
GC
SLV0
SLV1
SLV2
SLV3
SLV4
SLV5
SLV6
7 6 5 4 3 2 1 0
SMBODAT
8
7
MSBs
0000000b
A
B
A=B
N
1
0
FILTER
FROM FIG. 25A

FIG. 25B

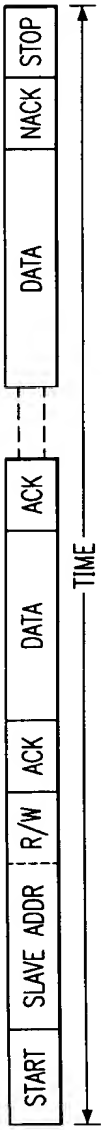

START
SLAVE ADDR
R/W
ACK
DATA
ACK
DATA
NACK
STOP
TIME

FIG. 27

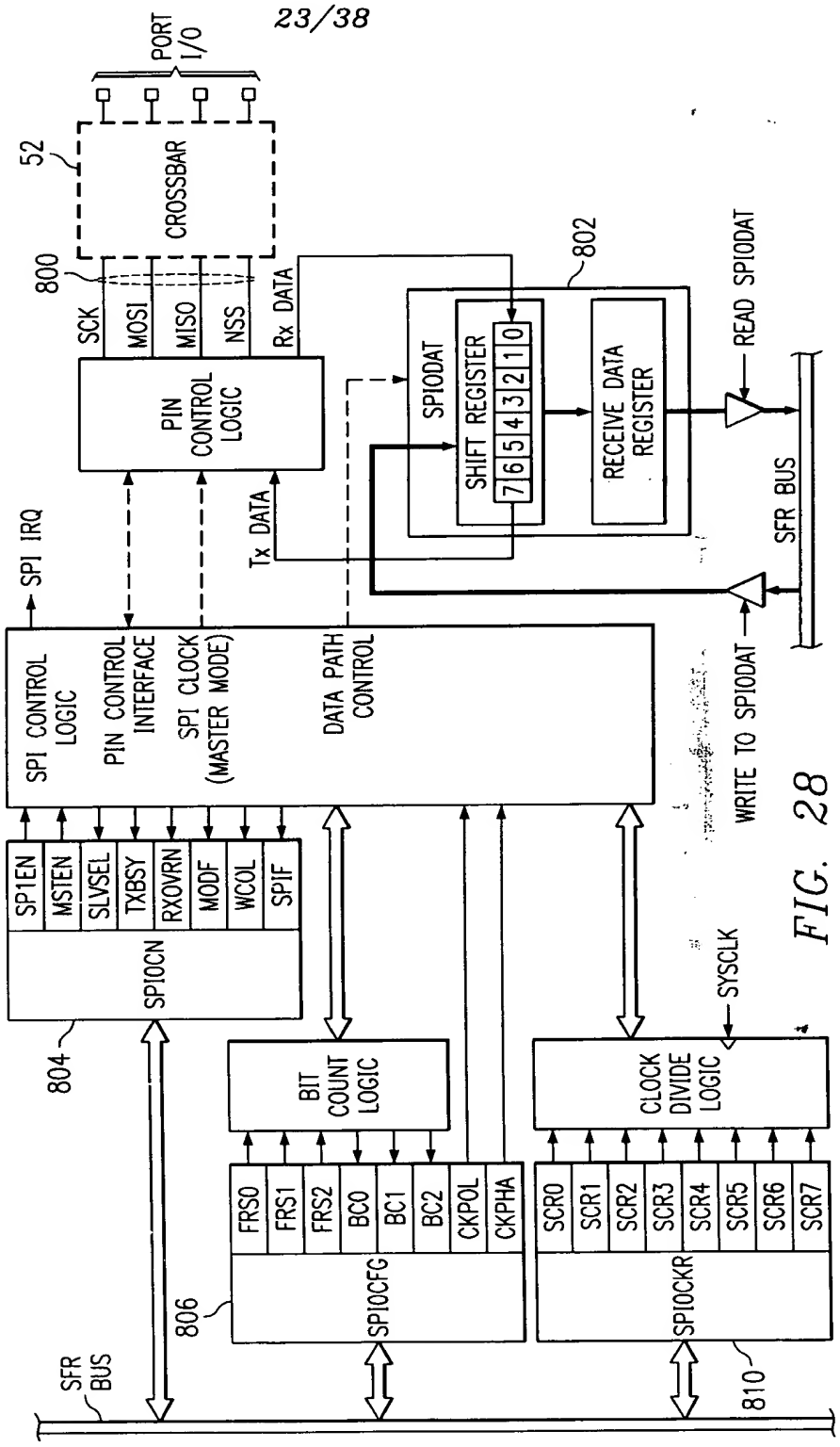

PORT I/O
52
CROSSBAR
800
SCK
MOSI
MISO
NSS
Rx DATA
PIN CONTROL LOGIC
802
SPI0DAT
SHIFT REGISTER
7 6 5 4 3 2 1 0
RECEIVE DATA REGISTER
READ SPI0DAT
SFR BUS
Tx DATA
SPI IRQ
SPI CONTROL LOGIC
PIN CONTROL INTERFACE
SPI CLOCK (MASTER MODE)
DATA PATH CONTROL
WRITE TO SPI0DAT
SP1EN
MSTEN
SLVSEL
TXBSY
RXOVRN
MODF
WCOL
SPIF
SPI0CN
804
BIT COUNT LOGIC
SYSCLK
CLOCK DIVIDE LOGIC
FRS0
FRS1
FRS2
BC0
BC1
BC2
CKPOL
CKPHA
SCR0
SCR1
SCR2
SCR3
SCR4
SCR5
SCR6
SCR7
SPI0CFG
SPI0CKR
806
SFR BUS
810

FIG. 28

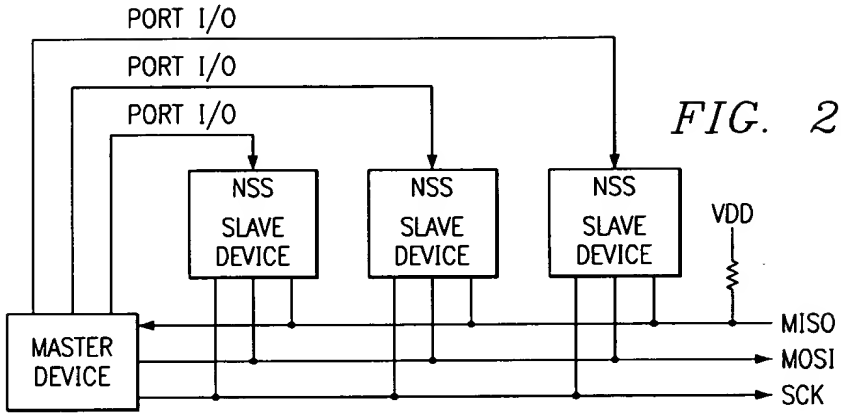


FIG. 29

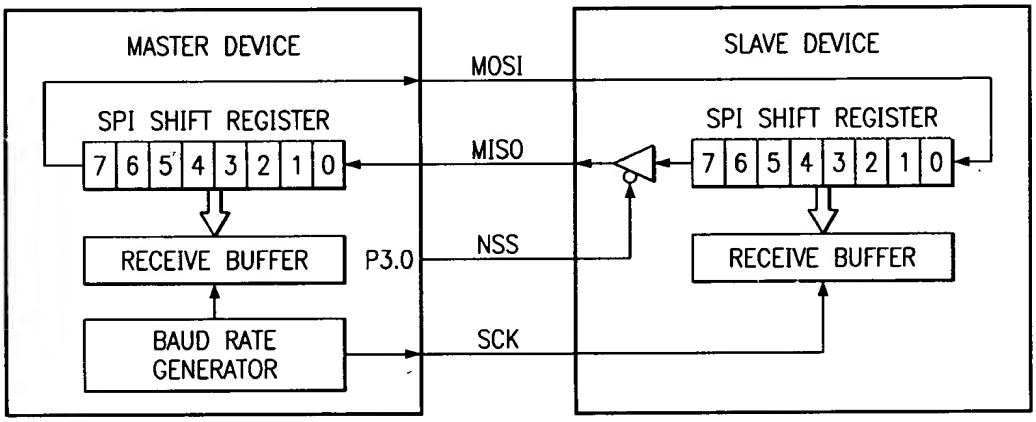


FIG. 30

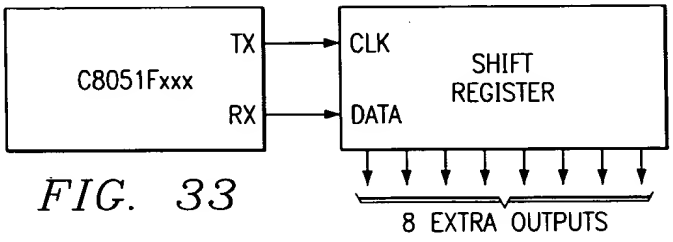


FIG. 33

FIG. 31

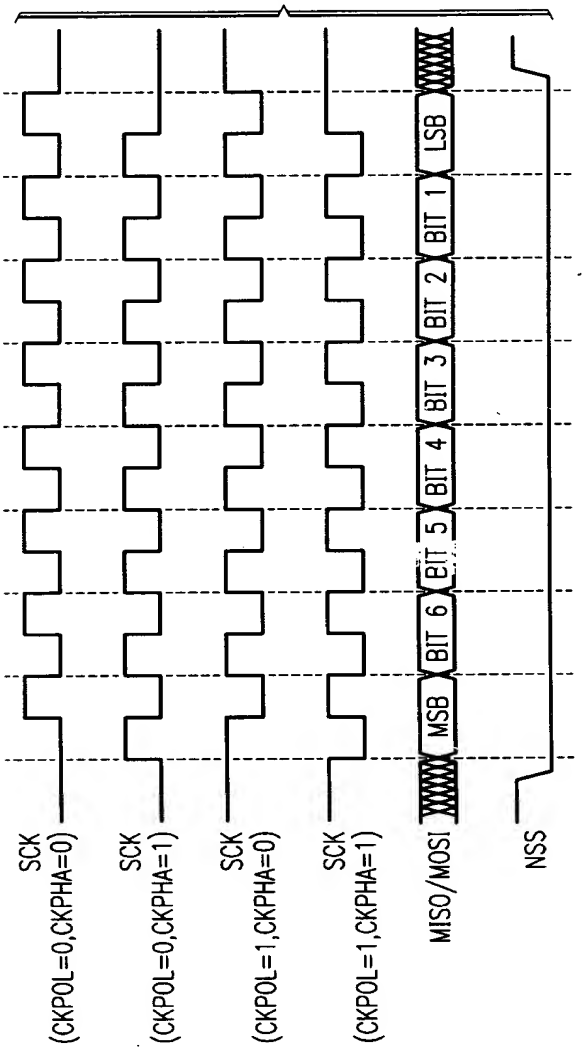

SCK
(CKPOL=0,CKPHA=0)
SCK
(CKPOL=0,CKPHA=1)
SCK
(CKPOL=1,CKPHA=0)
SCK
(CKPOL=1,CKPHA=1)
MISO/MOSI
MSB
BIT 6
BIT 5
BIT 4
BIT 3
BIT 2
BIT 1
LSB
NSS

FIG. 34

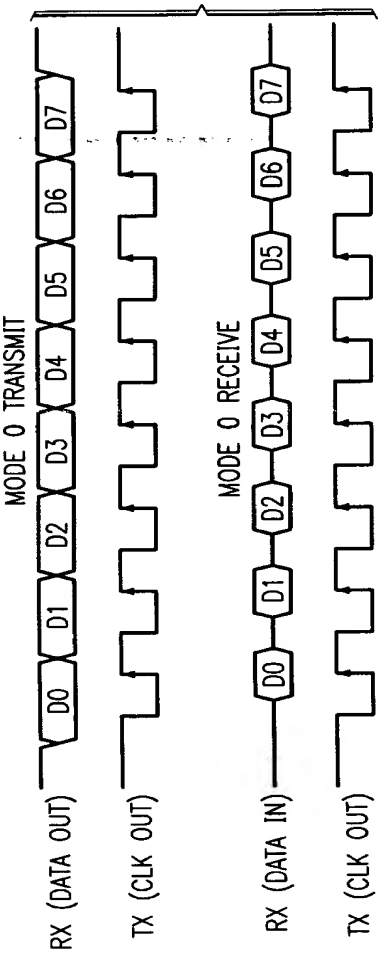

MODE 0 TRANSMIT
RX (DATA OUT)
D0
D1
D2
D3
D4
D5
D6
D7
TX (CLK OUT)
MODE 0 RECEIVE
RX (DATA IN)
TX (CLK OUT)

FIG. 32A

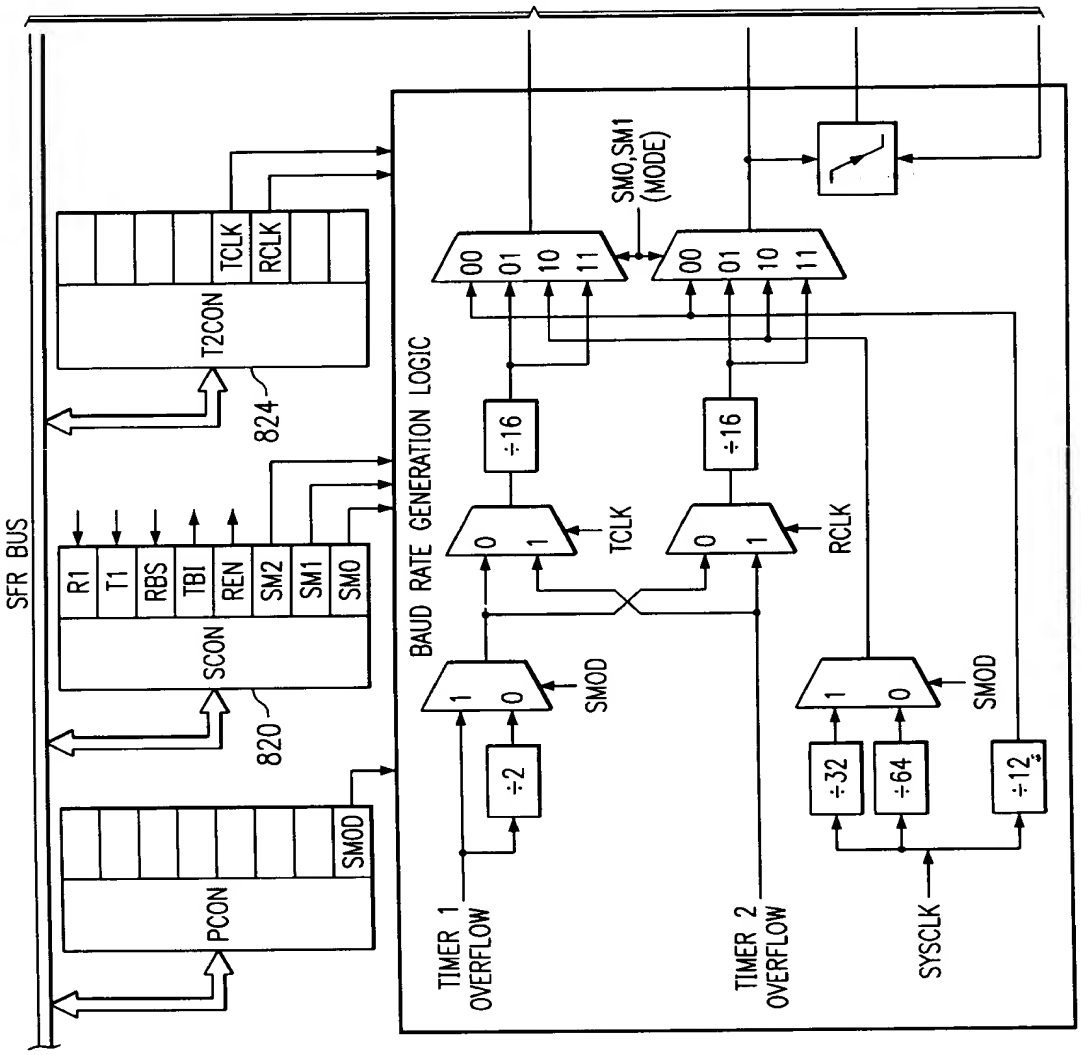
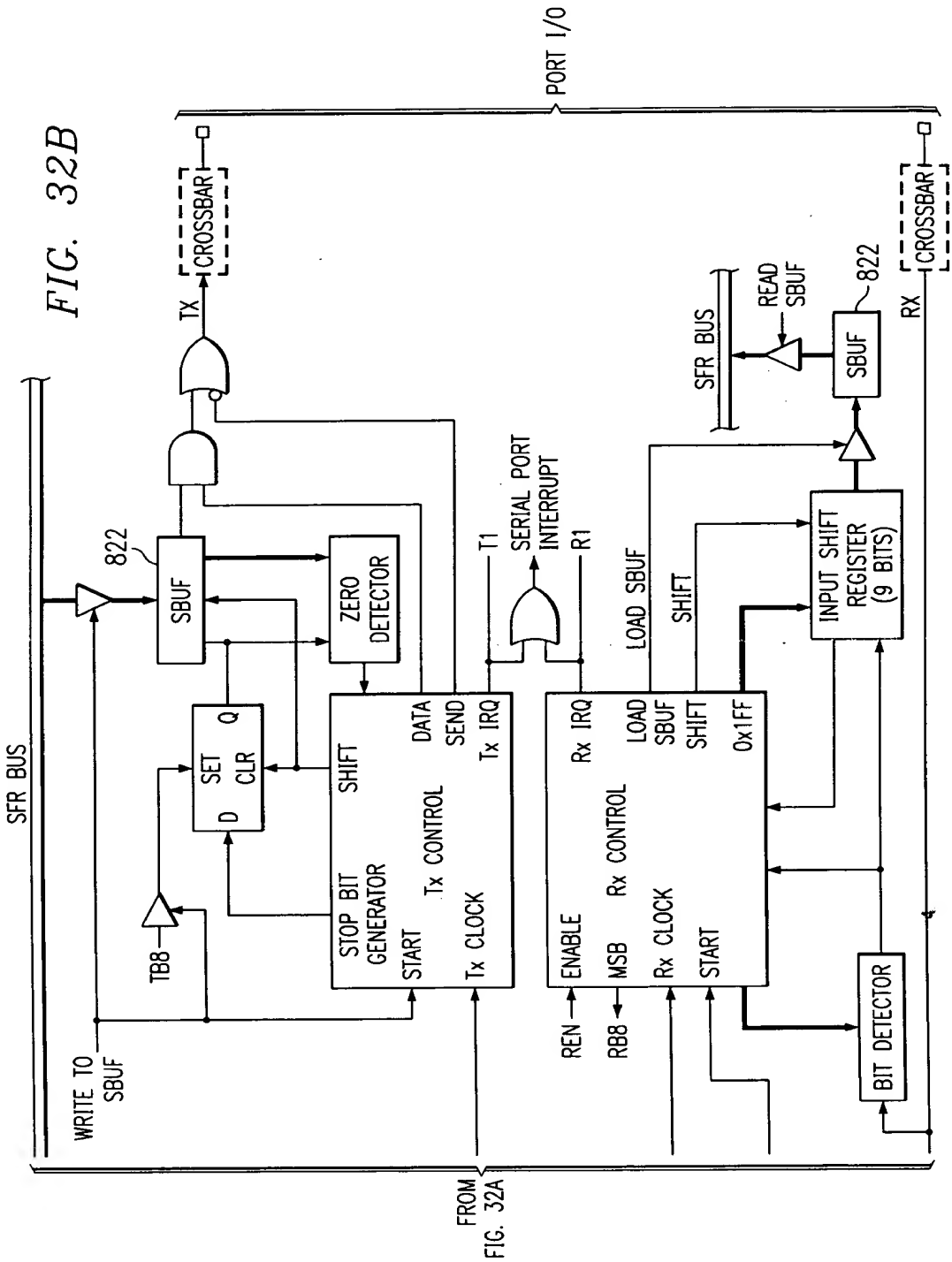

TO FIG. 32B
SFR BUS
BAUD RATE GENERATION LOGIC
SM0,SM1 (MODE)
00
01
10
11
T2CON
TCLK
RCLK
824
÷16
÷16
TCLK
RCLK
R1
T1
RBS
TBI
REN
SM2
SM1
SM0
SCON
820
SMOD
SMOD
÷2
÷32
÷64
÷12
PCON
SMOD
TIMER 1 OVERFLOW
TIMER 2 OVERFLOW
SYSCLK

FIG. 32B


PORT I/O
TX
CROSSBAR
RX
CROSSBAR
SFR BUS
READ SBUF
822
SBUF
822
SBUF
ZERO DETECTOR
T1
SERIAL PORT INTERRUPT
R1
LOAD SBUF
SHIFT
INPUT SHIFT REGISTER (9 BITS)
SET
CLR
D
Q
SHIFT
DATA
SEND
Tx IRQ
Rx IRQ
LOAD SBUF
SHIFT
0x1FF
TB8
STOP BIT GENERATOR
START
Tx CONTROL
Tx CLOCK
ENABLE
MSB
Rx CONTROL
Rx CLOCK
START
REN
RB8
BIT DETECTOR
WRITE TO SBUF
SFR BUS
FROM FIG. 32A

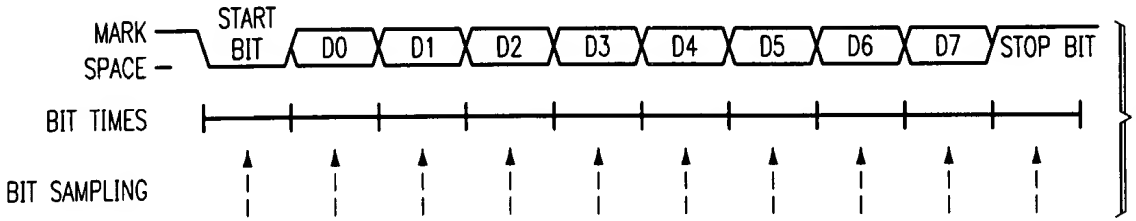


FIG. 35

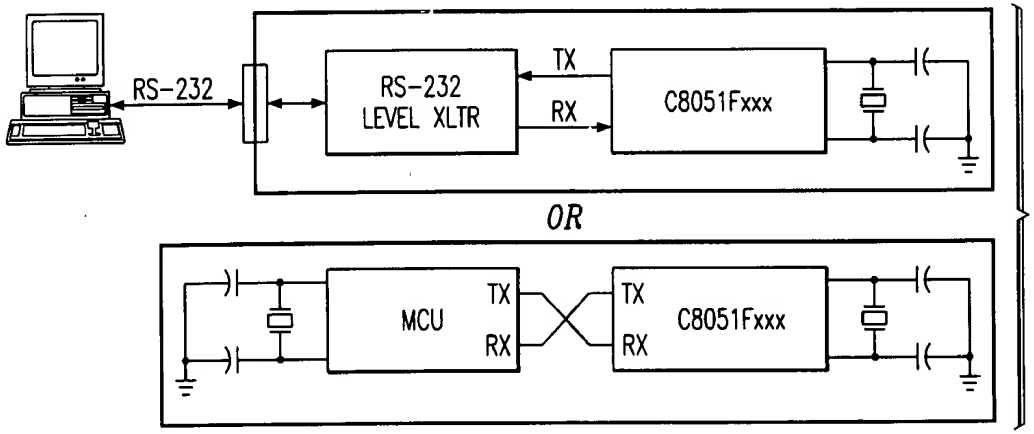


FIG. 36

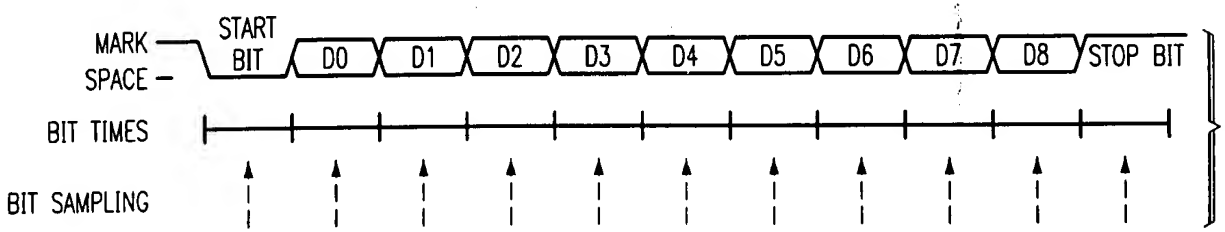


FIG. 37

FIG. 38

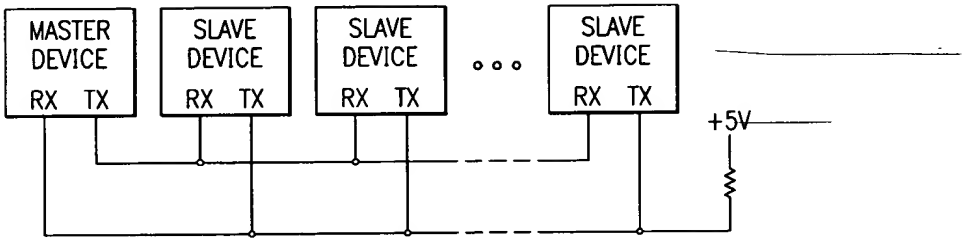
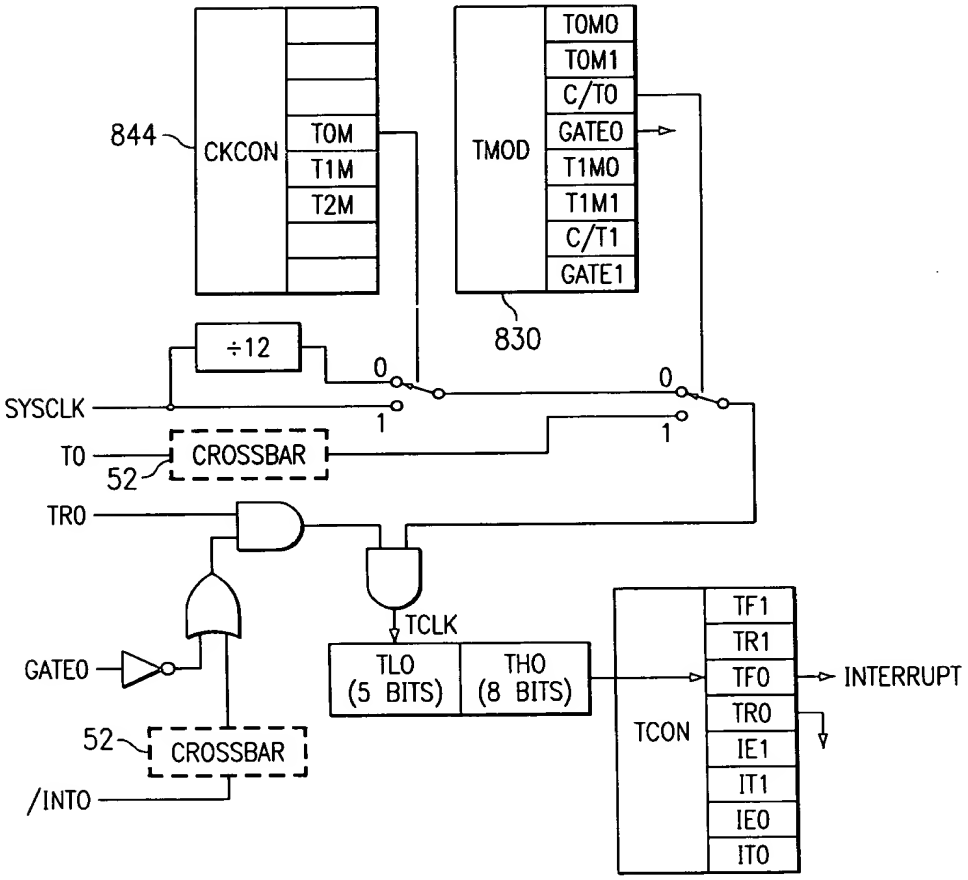

MASTER DEVICE
RX TX
SLAVE DEVICE
RX TX
SLAVE DEVICE
RX TX
SLAVE DEVICE
RX TX
+5V

FIG. 39


844
CKCON
T0M
T1M
T2M
TMOD
T0M0
T0M1
C/T0
GATE0
T1M0
T1M1
C/T1
GATE1
830
÷12
0
1
SYSCLK
T0
52
CROSSBAR
TR0
TCLK
GATE0
TL0 (5 BITS)
TH0 (8 BITS)
TCON
TF1
TR1
TF0
TR0
IE1
IT1
IE0
IT0
INTERRUPT
52
CROSSBAR
/INT0

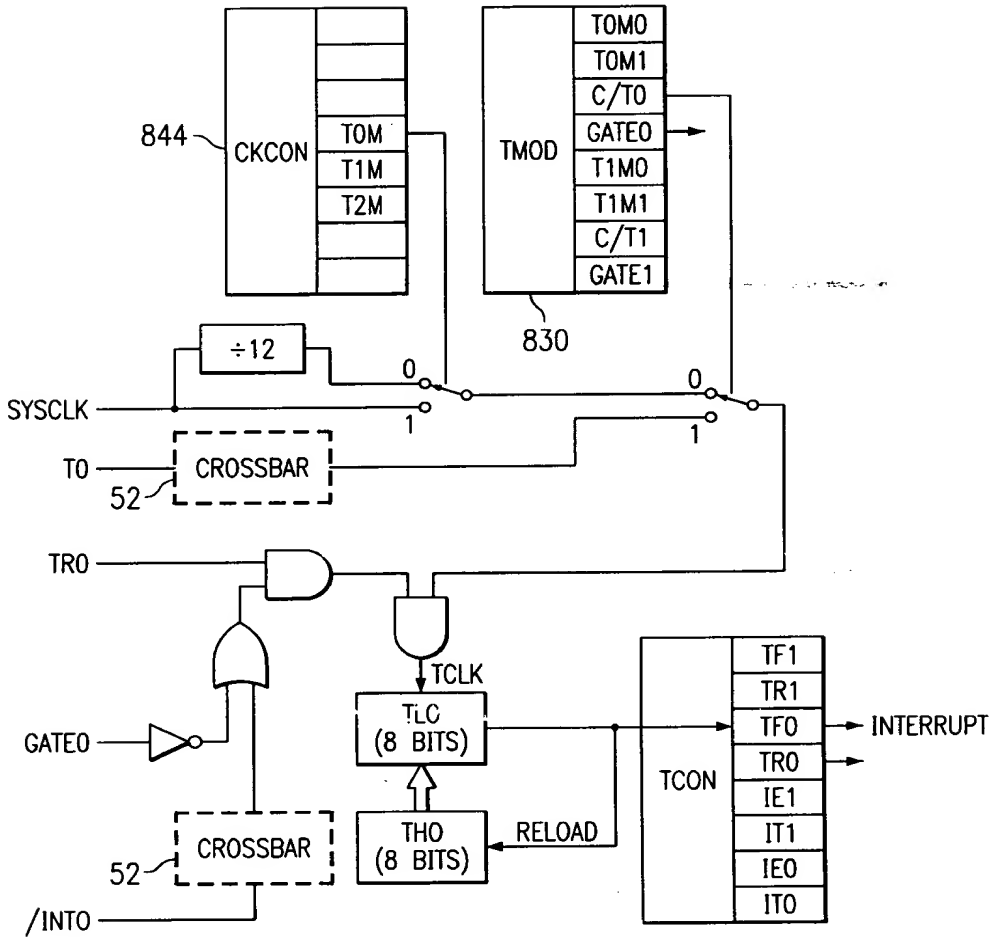

844
CKCON
T0M
T1M
T2M
TMOD
T0M0
T0M1
C/T0
GATE0
T1M0
T1M1
C/T1
GATE1
830
÷12
SYSCLK
0
1
0
1
T0
CROSSBAR
52
TR0
TCLK
GATE0
TLC
(8 BITS)
TCON
TF1
TR1
TF0
TR0
IE1
IT1
IE0
IT0
INTERRUPT
CROSSBAR
52
THO
(8 BITS)
RELOAD
/INT0

FIG. 40

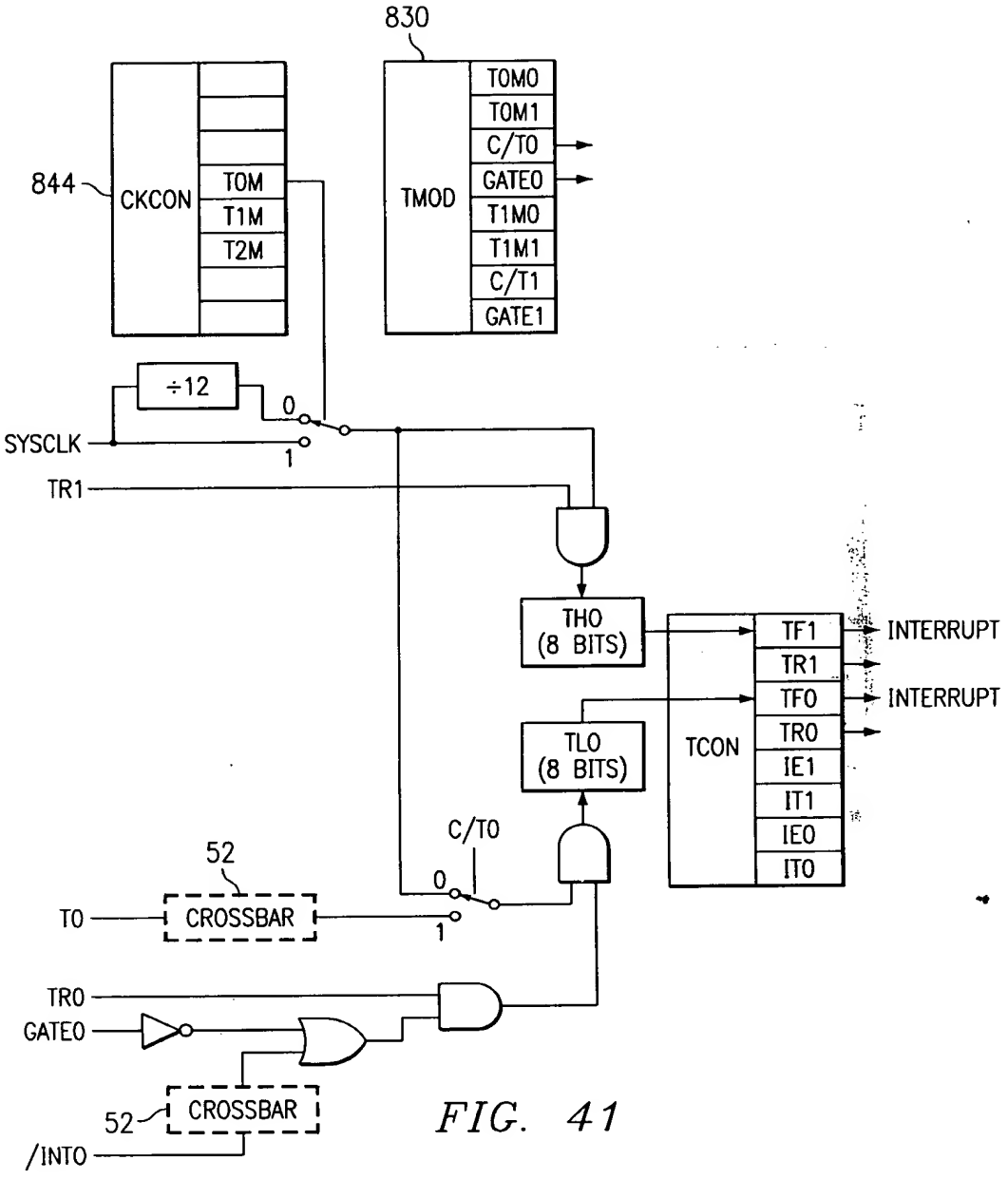

830
T0M0
T0M1
C/T0
GATE0
T1M0
T1M1
C/T1
GATE1
TMOD
844
CKCON
T0M
T1M
T2M
÷12
SYSCLK
TR1
TH0
(8 BITS)
TL0
(8 BITS)
TF1
TR1
TF0
TR0
IE1
IT1
IE0
IT0
TCON
INTERRUPT
INTERRUPT
C/T0
52
T0
CROSSBAR
TR0
GATE0
52
CROSSBAR
/INT0

FIG. 41

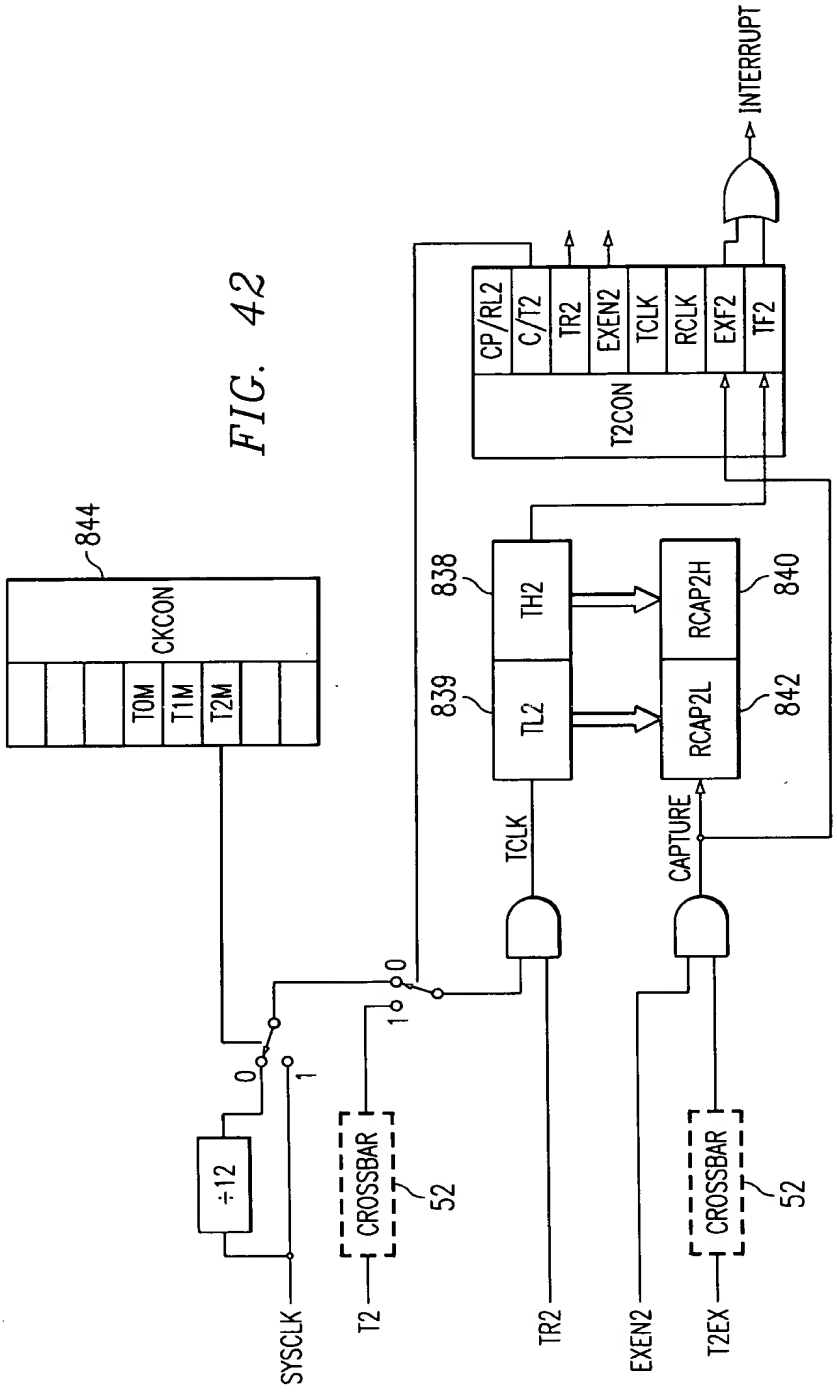
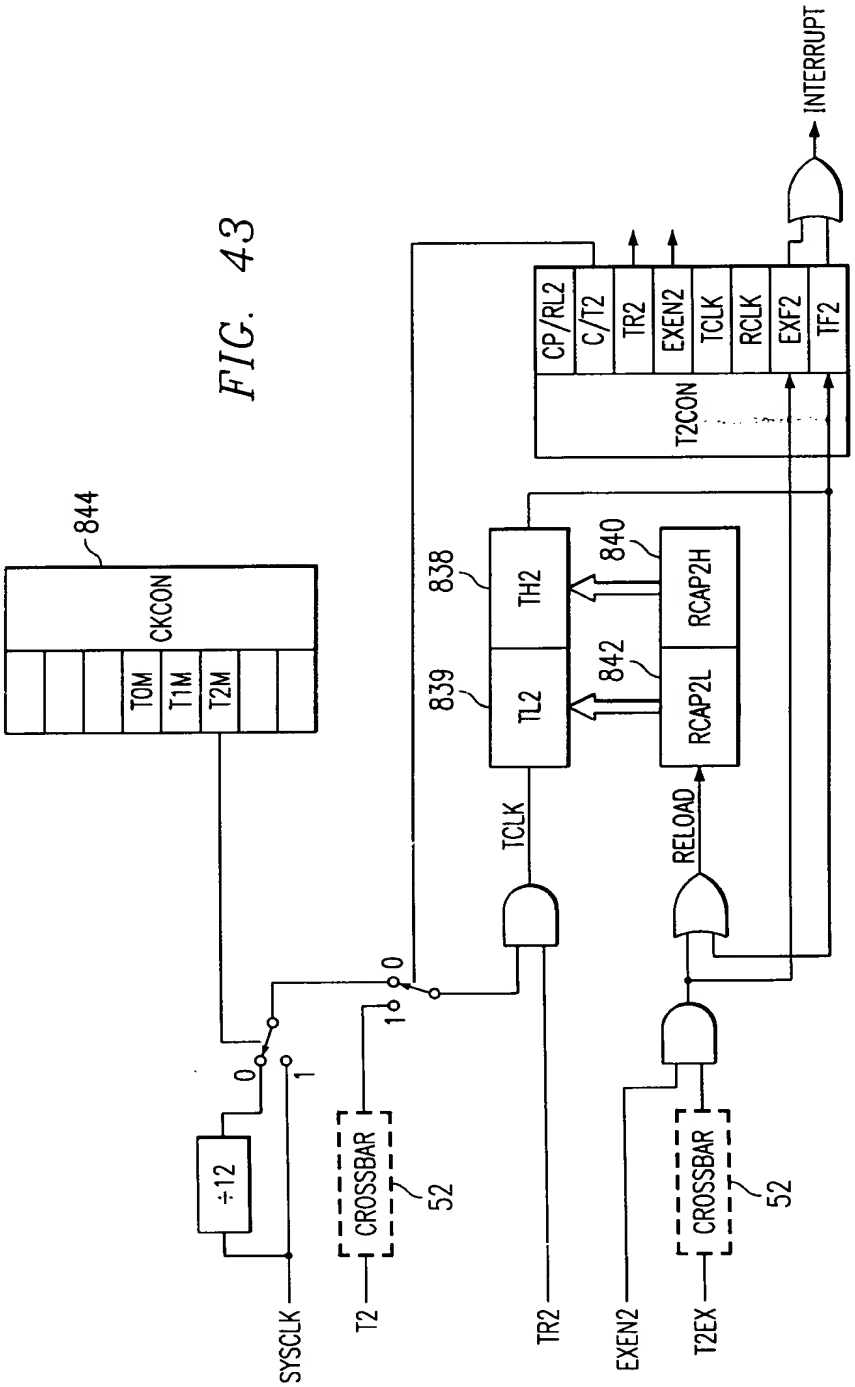

INTERRUPT
CP/RL2
C/T2
TR2
EXEN2
TCLK
RCLK
EXF2
TF2
T2CON
844
CKCON
T0M
T1M
T2M
838
TH2
RCAP2H
840
839
TL2
RCAP2L
842
TCLK
CAPTURE
0
1
÷12
CROSSBAR
52
SYSCLK
T2
TR2
EXEN2
T2EX
CROSSBAR
52

FIG. 42

FIG. 43


INTERRUPT
CP/RL2
C/T2
TR2
EXEN2
TCLK
RCLK
EXF2
TF2
T2CON
844
CKCON
T0M
T1M
T2M
838
TH2
840
RCAP2H
839
TL2
842
RCAP2L
TCLK
RELOAD
0
1
0
1
÷12
CROSSBAR
52
CROSSBAR
52
SYSCLK
T2
TR2
EXEN2
T2EX

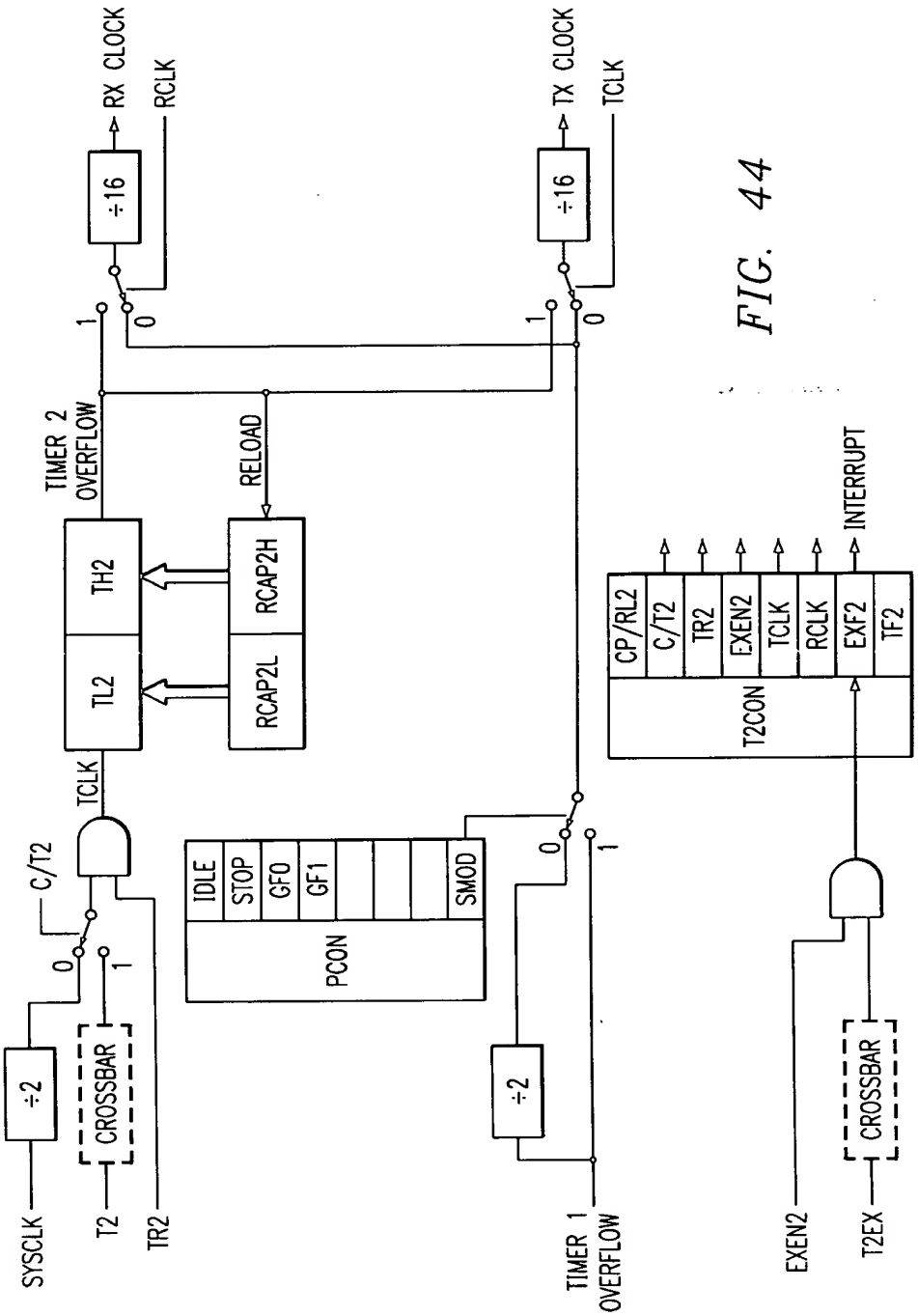

RX CLOCK
RCLK
÷16
TX CLOCK
TCLK
÷16
TIMER 2 OVERFLOW
RELOAD
TH2
TL2
RCAP2H
RCAP2L
TCLK
C/T2
IDLE
STOP
GF0
GF1
SMOD
PCON
CP/RL2
C/T2
TR2
EXEN2
TCLK
RCLK
EXF2
TF2
T2CON
INTERRUPT
÷2
CROSSBAR
SYSCLK
T2
TR2
÷2
TIMER 1 OVERFLOW
EXEN2
T2EX
CROSSBAR

FIG. 44

FIG. 45

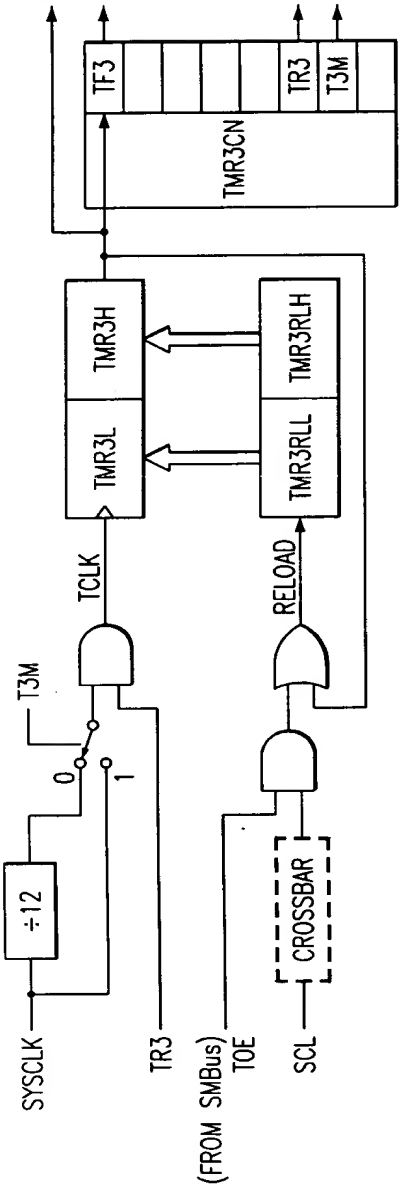

(TO ADC)
INTERRUPT
TF3
TR3
T3M
TMR3CN
TMR3H
TMR3L
TMR3RLH
TMR3RLL
TCLK
RELOAD
T3M
0
1
÷12
SYSCLK
TR3
(FROM SMBus)
TOE
SCL
CROSSBAR

FIG. 47

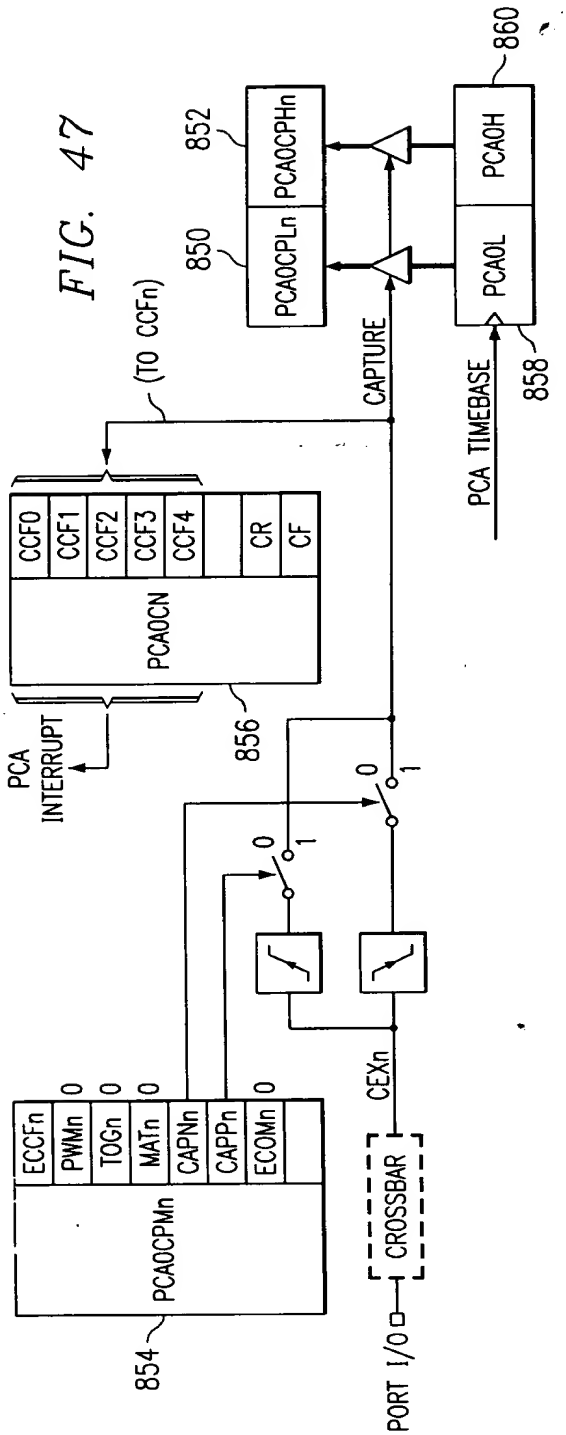
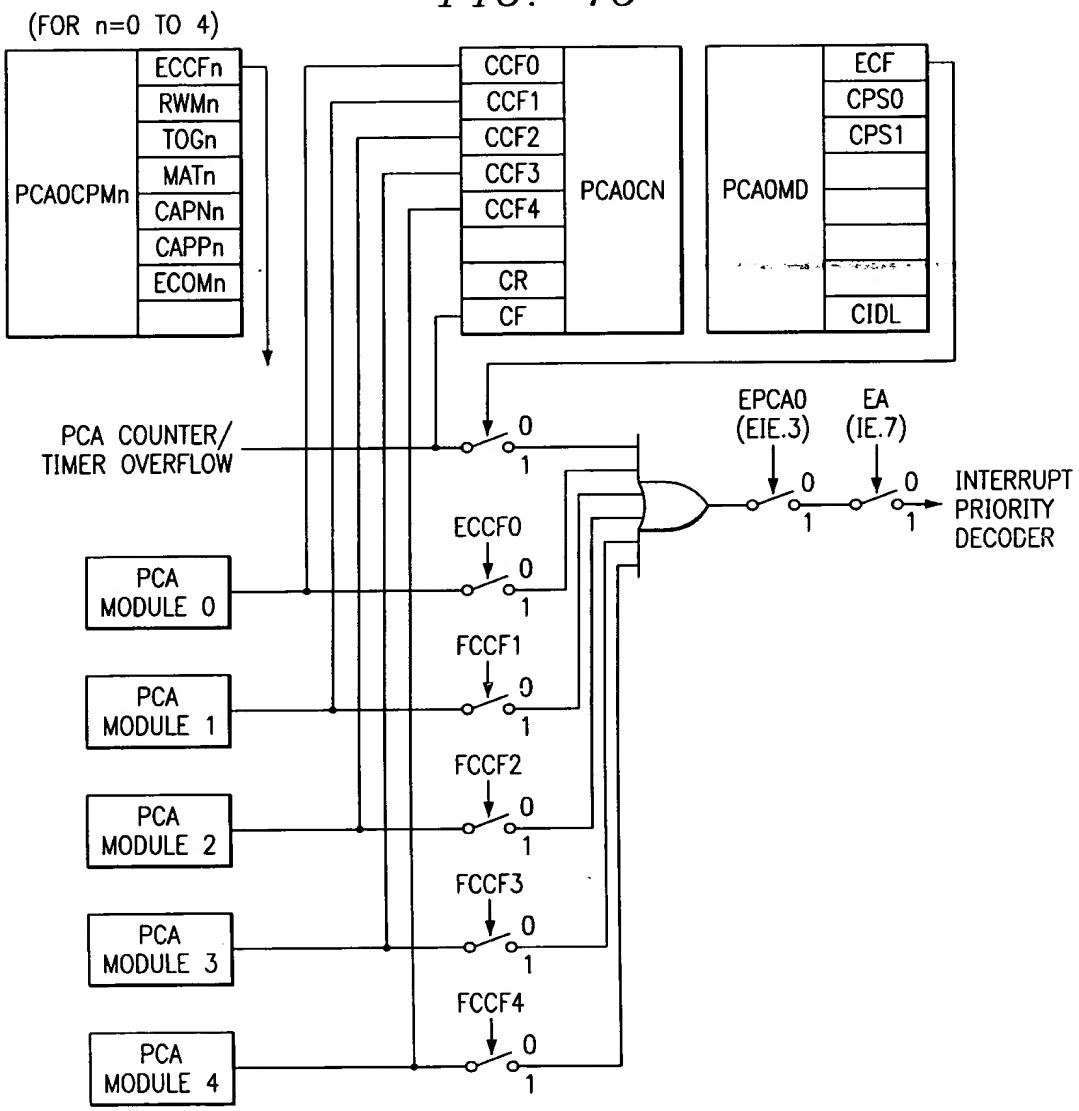

860
852
PCA0CPHn
PCA0H
850
PCA0CPLn
PCA0L
(TO CCFn)
CAPTURE
PCA TIMEBASE
858
CCF0
CCF1
CCF2
CCF3
CCF4
CR
CF
PCA0CN
PCA INTERRUPT
856
0
1
ECCFn
PWMn
TOGn
MATn
CAPNn
CAPPn
ECOMn
PCA0CPMn
CEXn
854
PORT I/O
CROSSBAR

FIG. 46


(FOR n=0 TO 4)
PCA0CPMn
ECCFn
RWMn
TOGn
MATn
CAPNn
CAPPn
ECOMn
CCF0
CCF1
CCF2
CCF3
CCF4
CR
CF
PCA0CN
PCA0MD
ECF
CPS0
CPS1
CIDL
PCA COUNTER/
TIMER OVERFLOW
ECCF0
FCCF1
FCCF2
FCCF3
FCCF4
PCA
MODULE 0
PCA
MODULE 1
PCA
MODULE 2
PCA
MODULE 3
PCA
MODULE 4
EPCA0
(EIE.3)
EA
(IE.7)
INTERRUPT
PRIORITY
DECODER
0
1

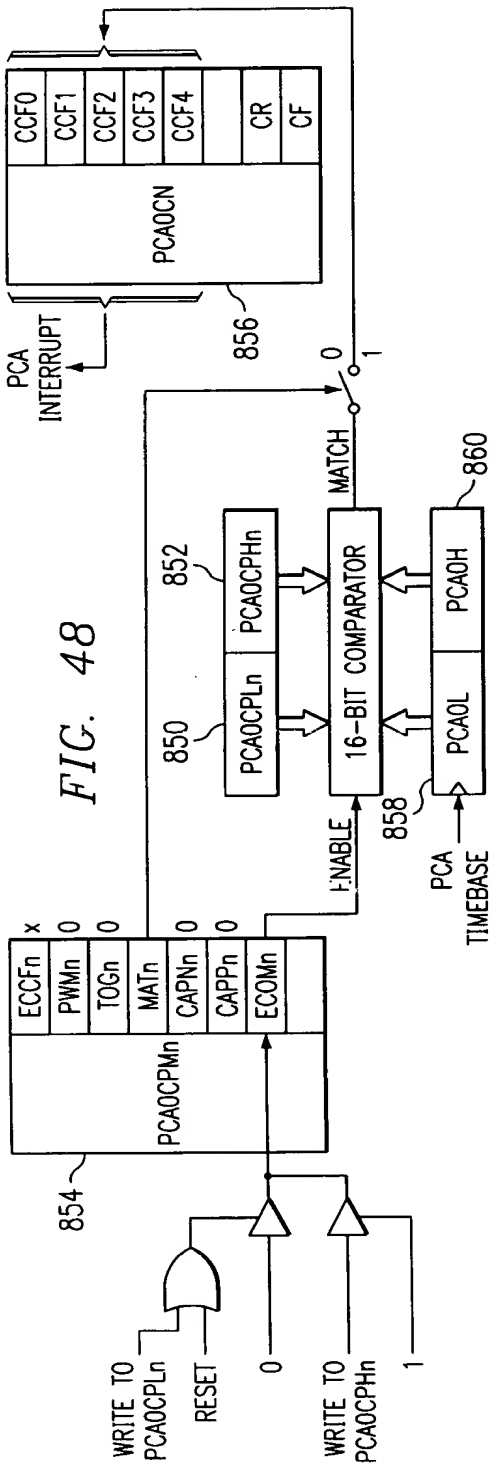

CCF0
CCF1
CCF2
CCF3
CCF4
CR
CF
PCA0CN
PCA INTERRUPT
856
MATCH
860
852
PCA0CPHn
PCA0CPLn
850
16-BIT COMPARATOR
PCA0H
PCA0L
858
ENABLE
PCA TIMEBASE
ECCFn
PWMn
TOGn
MATn
CAPNn
CAPPn
ECOMn
PCA0CPMn
854
WRITE TO PCA0CPLn
RESET
0
WRITE TO PCA0CPHn
1

FIG. 48

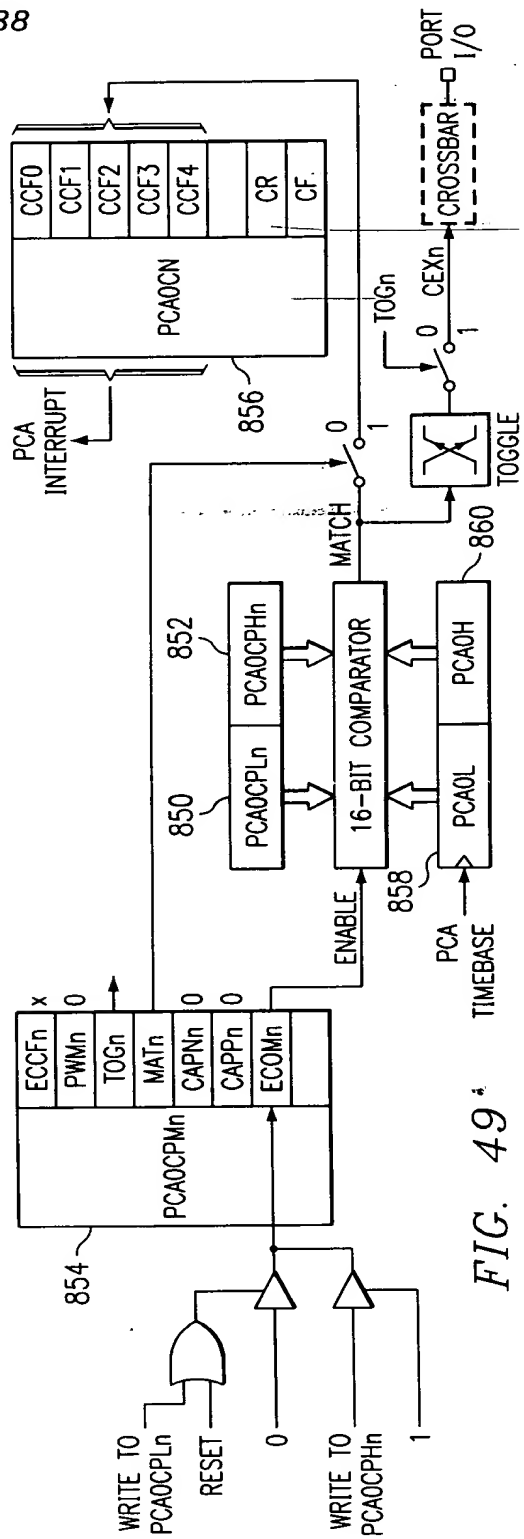

CCF0
CCF1
CCF2
CCF3
CCF4
CR
CF
PCA0CN
PCA INTERRUPT
856
PORT I/O
CROSSBAR
CEXn
TOGn
TOGGLE
MATCH
860
852
PCA0CPHn
PCA0CPLn
850
16-BIT COMPARATOR
PCA0H
PCA0L
858
ENABLE
PCA TIMEBASE
ECCFn
PWMn
TOGn
MATn
CAPNn
CAPPn
ECOMn
PCA0CPMn
854
WRITE TO PCA0CPLn
RESET
0
WRITE TO PCA0CPHn
1

FIG. 49

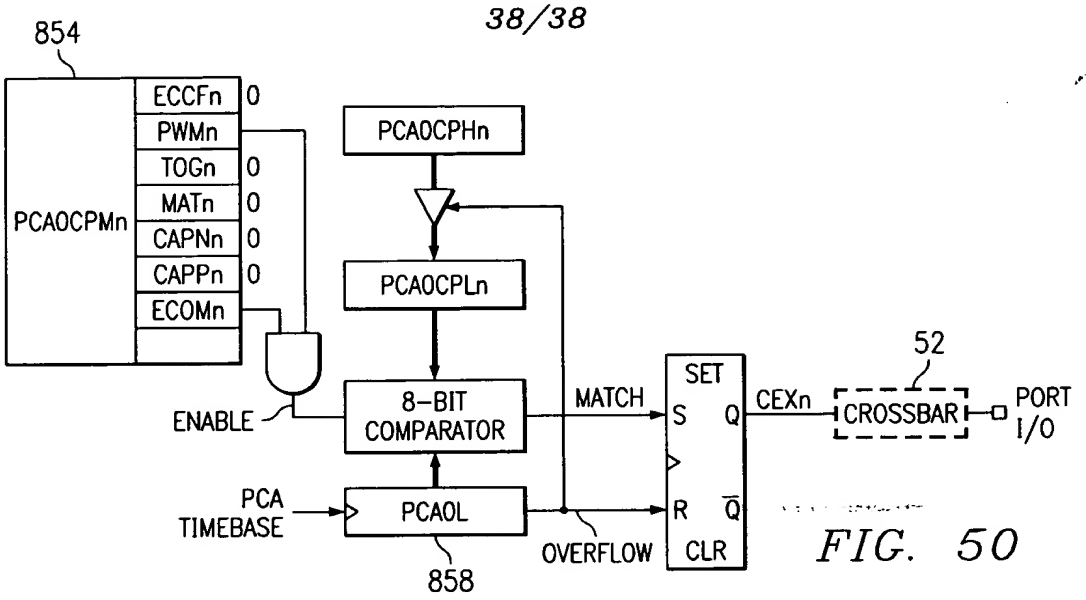

854
PCA0CPMn
ECCFn
PWMn
TOGn
MATn
CAPNn
CAPPn
ECOMn
0
0
0
0
0
PCA0CPHn
PCA0CPLn
ENABLE
8-BIT COMPARATOR
MATCH
SET
S
Q
R
Q
CLR
CEXn
52
CROSSBAR
PORT I/O
PCA TIMEBASE
PCA0L
858
OVERFLOW

FIG. 50

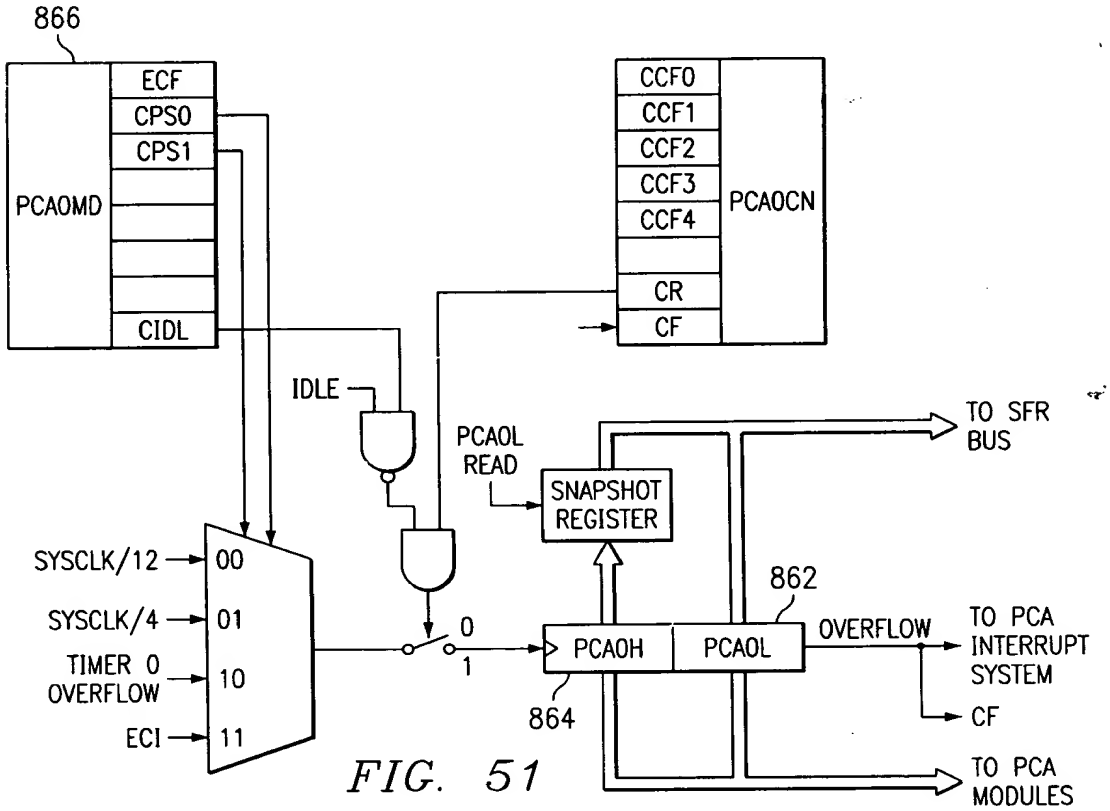

866
PCA0MD
ECF
CPS0
CPS1
CIDL
PCA0CN
CCF0
CCF1
CCF2
CCF3
CCF4
CR
CF
IDLE
PCA0L READ
SNAPSHOT REGISTER
TO SFR BUS
SYSCLK/12
SYSCLK/4
TIMER 0 OVERFLOW
ECI
00
01
10
11
0
1
862
PCA0H
PCA0L
OVERFLOW
TO PCA INTERRUPT SYSTEM
CF
TO PCA MODULES
864

FIG. 51